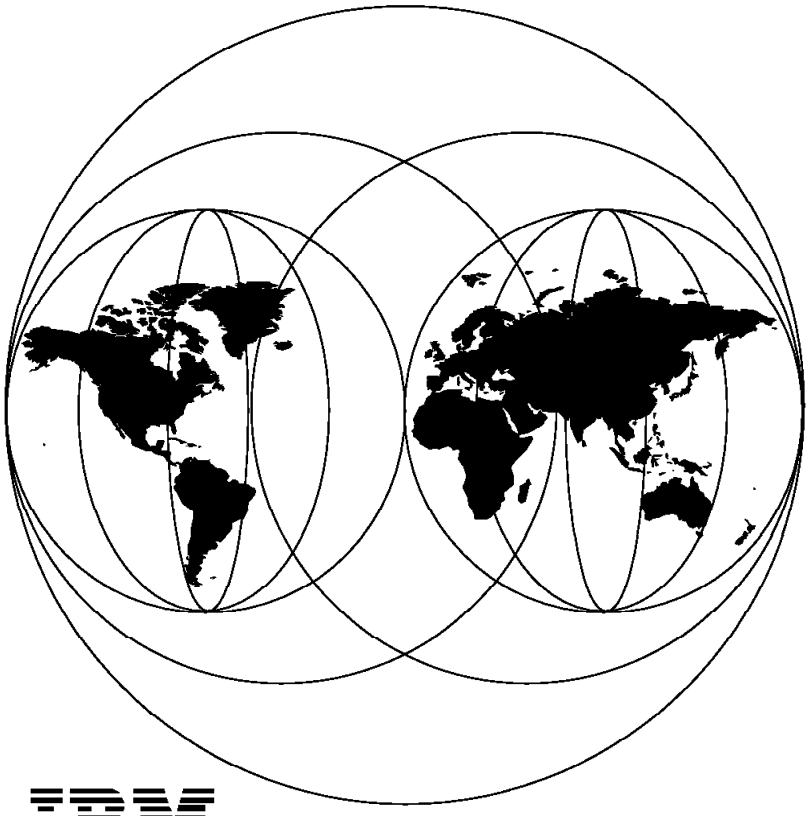
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AS/400 Performance Explorer Tips and Techniques

March 1997



IBM

International Technical Support Organization
Rochester Center



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SG24-4781-00

AS/400 Performance Explorer Tips and Techniques

March 1997

Take Note!

Before using this information and the product it supports, be sure to read the general information in Appendix F, “Special Notices” on page 501.

First Edition (March 1997)

This edition applies to Version 3 Release 6 and Version 3 Release 7 of OS/400 Operating System (5716-SS1) and Version 3 Release 6 and Version 3 Release 7 of the Licensed Program Product Performance Tools/400 (5716-PT1) for use with the RISC AS/400 Advanced Systems.

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Preface

This redbook provides descriptions and detailed examples of the Performance Explorer (PEX) capabilities available under AS/400 V3R6 and V3R7 OS/400 and the Performance Tools/400 licensed program 5716-PT1. Specific application examples and reports are used to augment the Performance Explorer documentation contained in *Performance Tools/400*, SC41-4340.

This redbook is primarily addressed to ″AS/400 performance experts″ who are already familiar with other AS/400 performance tools and need to use the Performance Explorer capabilities to identify and resolve performance-related problems.

Example problems and reports are provided for PEX statistics (*STATS), program source statement profile (*PROFILE), and trace (*TRACE) functions. In addition to standard PEX *TRACE functions, this redbook also provides examples of ″enhanced PEX *TRACE″ capabilities available only through the special PTFs documented in this redbook.

The Team That Wrote This Redbook

This redbook was produced by a team of specialists from around the world working at the International Technical Support Organization Rochester Center.

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Chapter 1. Performance Management and the Performance Explorer

The Performance Explorer (PEX) functions are a part of the entire set of AS/400 *performance tools* used in a total AS/400 *performance management* methodology. This chapter provides an overview of performance management considerations and identifies where the specific PEX functions can be used as part of this management.

1.1 Introduction to Performance Explorer

The AS/400 Performance Explorer (PEX) is a set of performance collection and reporting functions and commands that became available on RISC versions of OS/400, 5716-SS1, and the AS/400 Performance Tools/400, licensed program product (LPP) 5716-PT1.

The PEX functions, which are part of a total AS/400 performance management methodology, should not be the first set of performance tools used when analyzing a performance problem.

The PEX collection functions and related commands are included as part of the base OS/400 support.

The PEX reporting function and its associated command are part of the Performance Tools/400 LPP, manager feature 5101.

This separation of PEX definition and collection capabilities (under OS/400) and reporting capabilities (under the Performance Tools/400 licensed program) is similar to the usage of OS/400 Performance Monitor support to collect performance data, and the Performance Tools/400 licensed program to generate reports from the Performance Monitor collected data. Both the Performance Monitor collected data and PEX collected data are placed in multiple OS/400 database files.

If you do not use the Performance Tools/400 LPP Print Performance Explorer Report (PRTPEXRPT) command to produce summary and detail reports from the PEX collected data, you must write your own programs or queries to process the collected data. We recommend using the PRTPEXRPT command rather than writing your own programs and queries.

The Performance Explorer and Performance Monitor (STRPFRMON) data collection are separate from one another, producing two completely different sets of database files that contain grouped sets of collected data. Both collections of data can be running at the same time, although this should be kept to a minimum of time because system impact is significant with both collections active. Field definitions for both the Performance Monitor database files (starting with a QAPMxxxx prefix) and the Performance Explorer database files (starting with a QAYPExxxx prefix) are documented in *AS/400 Work Management*, SC41-4306.

All of the Performance Explorer commands are documented in online help text and in *Performance Tools/400*, SC41-4340.

This redbook is a supplement to the information contained in SC21-4340; review that manual for a basic description of the PEX support. Use this redbook for

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additional examples of the various PEX functions and documentation,and examples of Enhanced PEX TRACE support. Enhanced PEX TRACE support is available only with the PTFs listed in this redbook. This redbook contains the only description on how to use this Enhanced PEX TRACE support.

PEX provides three types of performance data analysis capabilities:

1. PEX STATS is focused on identifying application and IBM programs or modules consuming excessive CPU utilization or performing a high number of disk I/O operations. STATS is *program oriented*.

 STATS is a superset of and replaces the CISC systems Timing and Paging Statistics (TPST) PRPQ.

 TPST remains available on CISC (IMPI) AS/400 systems.

2. PEX PROFILE support is focused on identifying High Level Language (HLL) program hot spots (high CPU consumption) based upon source program statement numbers.

 Typically, you use PEX STATS to identify programs that should investigated further as potential performance bottlenecks. You also use PEX PROFILE on the programs identified for further analysis.

 PEX PROFILE is a superset of and replaces the CISC system Sampled Address Monitor (SAM) support available under the CISC system Performance Tools/400 Licensed Program Product (LPP), 5763-PT1, Manager feature 5101.

 SAM support remains available on CISC (IMPI) AS/400 systems.

3. PEX TRACE is a new function that collects detailed program, Licensed Internal Code (LIC) task, OS/400 job, and object reference information.

 PEX TRACE functions can be used to do additional job and program performance analysis. In cases where other performance tools usage cannot identify an application, set of jobs, or programs, the TRACE functions can be used system-wide to assist in identifying applications or programs that need further analysis.

 PEX TRACE function is similar to SMTRACE (Storage Management Trace) support that remains available on AS/400 CISC (IMPI) systems. On CISC systems, SMTRACE functions are available under special PTFs available only from IBM Software Defect (Level 2) Support.

 Enhanced PEX TRACE Consideration

 As shipped with standard OS/400 and Performance Tools/400, the PEX TRACE capabilities are usable only by a small group of AS/400 development lab level personnel.

 The special ″Enhanced PEX TRACE″ support, available through RISC system PTFs, and documented in this redbook, makes the PEX TRACE data usable to AS/400 performance experts in addition to development lab personnel.

Before going into more detail on PEX support, it is important to understand the total performance picture and the entire performance management methodology. The next topics outline the various steps involved in performance analysis in general, and where PEX capabilities could be used within this analysis.

1.2 Performance Management Methodology

Performance evaluation involves two distinct phases, pre-installation and post-installation, as shown in Figure 1 on page 5.

Pre-installation includes all the steps necessary to find which Application System/400 (AS/400) system is capable of performing all user requirements at an expected response time and throughput. The pre-installation phase is comprised mostly of *system sizing*. The applicable question is, “Who does what, and where, and how many times do they do it?”

Post-installation is concerned with *real*, and not perceived, performance problems. This phase requires a structured approach. It is important that you follow the post-installation tasks in Figure 1 on page 5 in the order presented.

Note: You find a mixture of all kinds of problems related to performance. Do your best to separate the valid performance concerns from the emotional issues and plain misunderstandings about what the system can deliver.

The primary tools used in the post-installation phase include:

- OS/400 system status performance commands:
 - Work with System Status (WRKSYSSTS)

 The Work with System Status (WRKSYSSTS) command can show real-time page fault rates that can be compared to page faults per second guideline values documented in *AS/400 Work Management*, SC41-4306, and *Performance Tools/400*, SC41-4340.
 - Work with Disk Status (WRKDSKSTS)

 The Work Disk Status (WRKDSKSTS) command can show the *percent busy* average for specific disks installed on the system. When performance is poor, an average of over 40% busy for all disks can indicate faster disk drives are required. A high disk-busy percentage, such as 80% or higher for one or a few disk devices, can indicate the application data is concentrated on too few disks; spreading of the data across more disks may be required to improve performance.
 - Work with Active Jobs (WRKACTJOB)

 The Work with Active Jobs (WRKACTJOB) command can be used to identify jobs that are doing abnormally high disk I/Os per second or consuming unexpectedly high CPU utilization.

 Use these commands repetitively over a time period of up to 20 minutes to ensure consistent status.
- OS/400 performance data collection commands:
 - Start and End the Performance Monitor (STRPFRMON, ENDPFRMON)
 - Define, Start, and End the Performance Explorer (ADDPEXDFN, STRPEX, ENDPEX) performance data

 As previously stated, these commands collect their unique sets of performance data.
- For SQL and general query performance evaluation, you should place the affected job in **debug mode** (OS/400 Start Debug (STRDBG) command) and analyze the job log messages issued by the query components of the system.

- The Performance Tools/400 LPP 5716-PT1 Agent (feature 5102) and Manager (feature 5101) capabilities:
 - System, job, and resource usage reports
 - Capacity planning (BEST/1)
 - The Work with System Activity (WRKSYSACT) command

 This command shows CPU utilization and disk I/O activity on a real-time basis for OS/400 jobs and system Licensed Internal Code (LIC) tasks.

 Use this command repetitively over a time period of up to 15 minutes to ensure consistent status.

 The Performance Tools/400 functions are used in system, application, and program tuning, based on the data collected by the performance monitor. See *Performance Tools/400*, SC41-4340, for a complete list of the reports produced by the Performance Tools.

Figure 1 on page 5 provides a picture of an overall performance management methodology by summarizing tasks to perform and performance problem considerations, and listing performance tools that can be used.

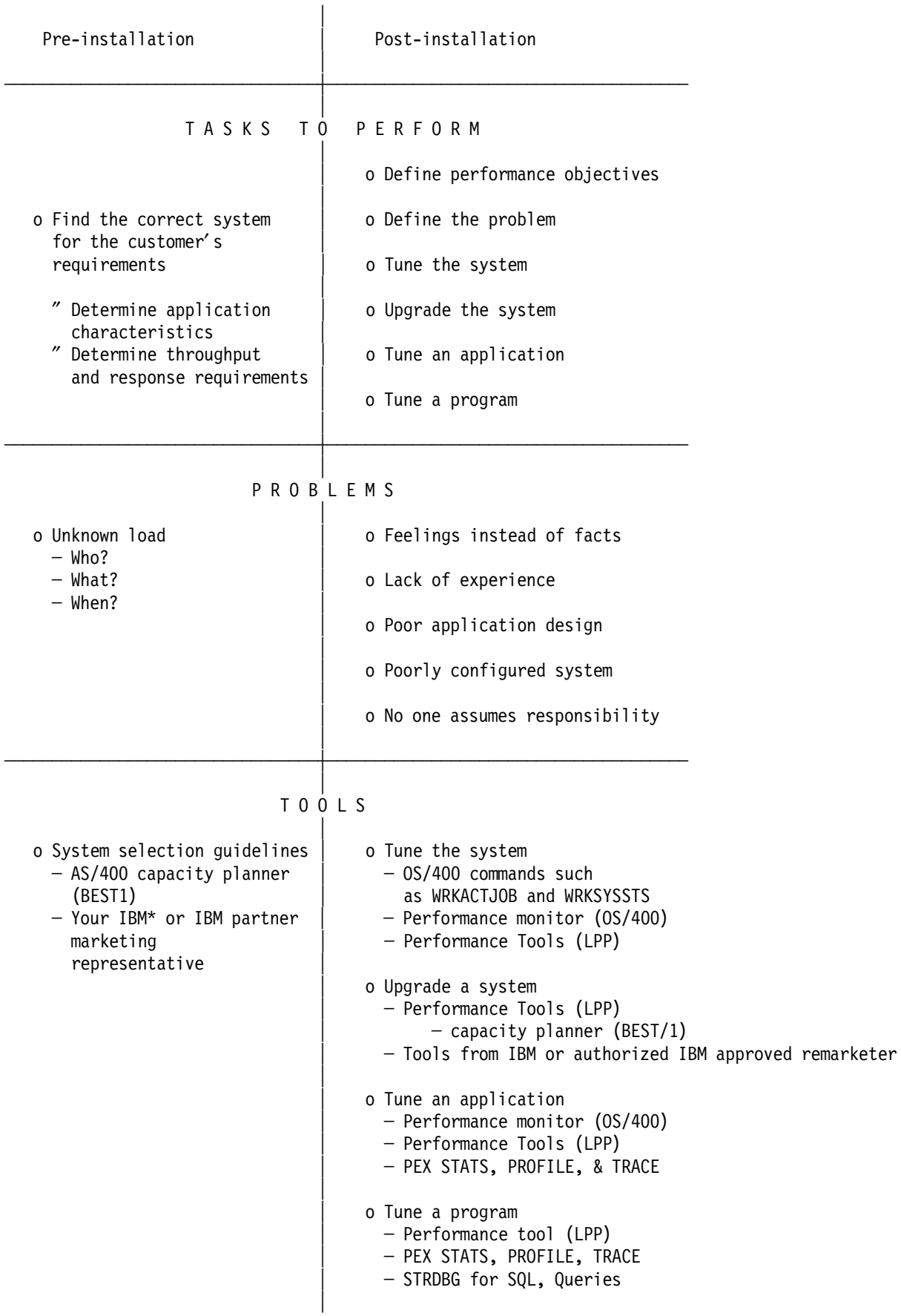


Figure 1. Overview of Performance Management

1.3 Processing of Work

The work a system does follows a simple process. A system processes requests from users; the requests are transformed by high-level language (HLL) programs to *use* the system's resource. Therefore, requests from users are the source of work on the system.

When designing an application to service these requests, use these objectives:

- Fulfill user requirements with as few system resources as possible.
- Know the effect, both inside and outside your application, of a user requirement that needs a lot of system resources.

The main goal is to have a *balanced* system where none of the system resources are a bottleneck.

As seen in Figure 2 on page 7, primary resources include CPU, main storage, and auxiliary storage (disk devices).

Using primary resources affects everyone on a system. If your resource requirements exceed what is possible on your system, you can either redesign your applications or add hardware resources. The choice often depends on expense and availability.

High usage of one of the secondary resources, such as communication lines or controllers, usually affects only some users. Unlike primary resources, adding hardware is often the most cost-effective means to relieve secondary resource bottlenecks.

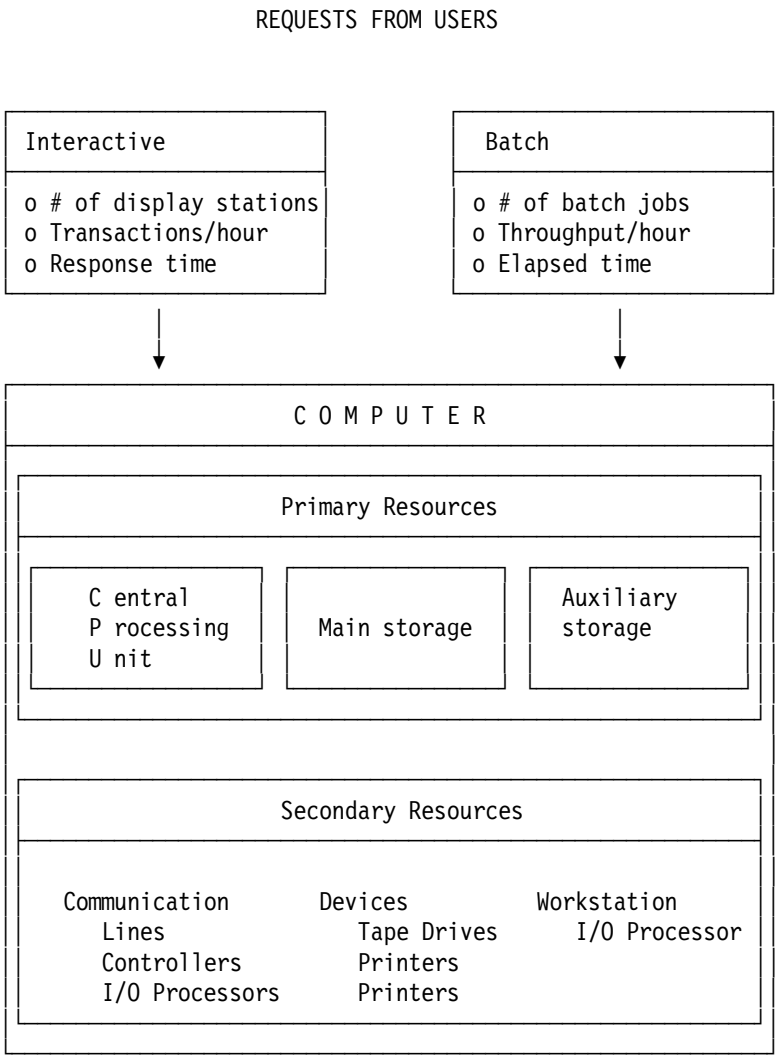


Figure 2. Processing of Work

1.4 Performance Evaluation Components

To discuss performance problems, rely on accepted definitions of *items that can be measured*. In particular, use the following definitions in reaching your performance objective:

- Interactive response time:

 Never discuss one specific response time. (How often have you heard, “We want sub-second response time”?) Response time must always be discussed with an upper limit, and is defined as:

 – The average elapsed time per interactive transaction, as viewed by the end user, in a defined time interval. An interactive transaction is from the time the user presses the Enter key until the Input Inhibit indication on the workstation is turned off.
 – The percentage of response times that do not exceed a specific length of time.

You may also want to break down the response time objectives by business functions, such as orders processed per hour.

- Batch throughput:
 - The time required to process a batch job.

 Often this is expressed in total run time. However, it is best to understand how many *non-interactive transactions* have been completed during a specific run time.

 Throughput can be expressed in business function units, such as invoices printed per hour, paychecks printed per hour, or inventory picking slips per hour.

Keep in mind that interactive response time and batch throughput affect each other. If you define one, you *must* define the other. For example, if you define a response time of less than 1.5 seconds 90% of the time, you must also state whether any other jobs, such as batch jobs, APPN communications, or PC Support file transfers are active at the same time.

It is important to know what is happening to the environment whenever a measurement is taken. A big difference exists between measuring a lightly used system and one at its peak load. Any environment you are measuring must have:

- A defined batch load
- A defined number of interactive transactions

It is also important to know which functions are most frequently used. A general rule of thumb is that 80% of all work done by the system is created by only 20% of the total various functions. Improving a small number of the more frequently used functions results in immediate and significant performance enhancements.

In summary, any agreement on performance should consist of:

- A definite response time range in a given environment.
- The elapsed time for specific batch runs in a given environment.
- An agreed upon definition of a ″transaction″ and transaction throughput per unit of time.
- The average usage of the primary and secondary resources.

1.5 General Performance Analysis Sequence

General tasks to be performed for any performance analysis include the following tasks:

1. Ensure you have a basic knowledge of the system, the application, and the performance issue.
2. Perform organizational tasks.
3. Perform system tuning tasks.
4. Propose a system upgrade, if applicable.
5. Perform application tuning tasks.
6. Perform program tuning tasks.

Step 5 and Step 6 can involve PEX STATS and PEX PROFILE data analysis. In some cases, you may also need to use the Enhanced PEX TRACE support. You must complete Step 1 through Step 4 before the use of PEX STATS or PROFILE or Enhanced TRACE can be of benefit. You may also want to evaluate the cost

of doing each of the preceding steps, particularly Step 4 versus Step 5 and Step 6, where application implementation expertise is required.

1.5.1 Organizational Tasks

Consider the following points *before* you begin any performance analysis:

1. Find the person who determines the performance objectives.
2. Find the person who **acts on** decisions; you should find an individual from both the user and system vendor organizations. Furthermore, the key is to find someone who knows how the application is written. Without this knowledge, it is difficult to relate the data PEX STATS or PEX PROFILE produces to the appropriate changes required for an application.
3. Define and characterize the problem. Describe the environment, including the hardware, software, and people involved. Create a list of all user requirements. Discuss what the user wants to achieve. What is the acceptable average response time in 90% of all cases? What is the acceptable elapsed time of a certain batch job? It is important to define the performance goal; otherwise, no defined end exists.
4. Measure and record the status of your system's performance on a regular basis. Keep a historical record of changes made. *It is a good idea to continue this record even after you have reached a performance goal*. You may have to start all over again in a year, and you want to have a record of what changes have occurred.
5. Use electronic customer support to check if any performance enhancement program temporary fixes (PTFs) are available for you to apply to your system. If you do not have electronic customer support installed on your AS/400 system, ask your AS/400 supplier.

 The IBM HONE Question and Answer support contains an important performance PTF item - RTA00003952. This is an index of performance-related PTFs for all supported AS/400 releases. You can have an IBM representative or other authorized user find and print this HONE item. RTA000089352 is updated approximately once per month.

 With electronic customer support enabled on your system, you can also reference the Preventative Service Planning (PSP) ″bucket,″ which contains AS/400 PTF information. You can download this information to your AS/400 system by using the Send PTF Order (SNPTFORD) command and specifying PTFID(SF98vrm), where v is version, r is release, and m is modification level of the operating system you want to receive information about.
6. When doing application or program tuning:
 a. Search for one or more solutions to improve the performance. These may include organizational operations (scheduling batch jobs at a different time) and application/system design issues (rewriting parts of programs).
 b. Evaluate alternatives to determine the most cost effective solution. Where do you get the most return for your investment? A small performance enhancement on a frequently called program may do much more for you than a major rewrite on a program that is infrequently called.
 c. It is important to implement one change at a time and measure the effects of that change.

d. Once you have applied a solution, continue to measure and record your system's performance.

1.5.2 System Tuning Tasks

Doing system tuning means you try to fairly share out the available system resources to users. Some actions to consider include:

- Decrease the number of activity levels, while maintaining the same size of the main storage pools, to minimize the number of database (DB) and non-database (NDB) faults.
- Increase the size of the main storage pools, while maintaining the same activity levels, to minimize the number of DB and NDB faults.
- Use the Dynamic Priority Scheduler or manually alter the run time priority for different jobs.

System tuning also involves making every attempt to minimize or eliminate unnecessary system work, such as:

- Monitoring the number and arrival rate of messages in the job and history logs.
- Monitoring all error logs in the system service tools.
- Avoiding multiple sign ons and sign offs.
- Regularly clearing all output queues, old history files, and all old journal entries.

 This helps to reduce the seek time per disk access and reduce the size of the Work Control Block Table. Further discussion about the Work Control Block Table can be found in 9.5.3.7, "Reads (*RS, *RSF) Against QWCBTxx Objects" on page 240.

For information about system tuning, see *AS/400 Work Management*, SC41-4306, and *Performance Tools/400*, SC41-4340.

When making changes be sure to make one at a time and measure the effect of that change.

Another way to affect system tuning is to redistribute the system's workload. Examples of this include moving all batch work to run at night, performing all system saves during a lower system usage time, assigning programmers their own storage pool or even a totally separate subsystem (to avoid interactive program compilations), and generally keeping the workload as constant as possible. If you have attempted all of these and still have not reached your target level of performance, you may need to consider the alternative of a hardware upgrade.

Upgrading your system's hardware may seem like an expensive undertaking. However, when you consider the cost of hiring and maintaining a staff with the skills necessary to further streamline your applications, the cost of upgrading your system hardware may be comparatively inexpensive.

1.5.3 System Upgrade Tasks

When upgrading a system, you are in either one of two situations:

- Adding a greater workload to an existing adequately sized system.
- Adding more resource to an existing overloaded system.

1.5.3.1 Adding Greater Workload

If you are adding workload to an adequately sized system, you must make sure the system is well-tuned **before adding a significant workload.** Measure the system using the Performance Monitor and the AS/400 Performance Tools. Create a BEST/1 model based on the measured data. (BEST/1 is part of the AS/400 Performance Tools and is the most typically used capacity planning tool on the AS/400 system.)

Validate the BEST/1 model against the measured performance data. You can do this comparison for response time, transactions per hour, and resource utilization by selecting the BEST/1 function *Measured and Predicted Comparison*, or you can manually compare the BEST/1 model values to the AS/400 Performance Tools System and Component Report values.

Before doing capacity planning involving additional transaction rates or additional applications, you must calibrate the model by comparing BEST/1 values to the measured performance data. For additional information on this calibration function, refer to the *BEST/1 Capcity Planning Tool* manual, SC41-3341.

Try to model the existing system as accurately as possible, with both an average and peak load measurement.

1.5.3.2 Adding More Resource

If you are adding hardware to an overloaded system, run the performance monitor and review the listings produced by the AS/400 Performance Tools, particularly the System, Component, and Transaction reports. From these, try to find the bottleneck.

Is the problem with:

- Primary resources?
 - Main storage (too high a faulting rate?)
 - CPU (utilization too high?)
 - Auxiliary storage (service times too high?)
- Secondary resources?
 - Communication lines or controllers (throughput constrained?)

You need to understand issues raised with the analysis of the primary and secondary resources. You can either accept them in the calibrated BEST/1 model or resolve them. If you resolve the problem with application changes, you need to collect Performance Monitor data again and create and calibrate another BEST/1 model before doing any growth analysis with BEST/1.

Once you are satisfied that the BEST/1 has been calibrated to your actual operating environment, you define as carefully as you can the additional workload and add this to the BEST/1 model. BEST/1 determines the required additional hardware based on the same factors you use to determine your performance goal - transaction throughput and response time.

Add all defined future requirements to the existing loads before coming to any conclusion on hardware configurations. You do not want to have to do this over again in six months!

1.5.4 Application Tuning Tasks

First, use the following steps in your investigation of whether your application could have its design improved:

1. Measure the system using the performance monitor, collecting trace data.
2. Review the System report and Component report to identify any extreme values. (For guidelines on resource utilizations, refer to *Performance Tools/400*, SC41-4340.)
3. For most Performance Tools/400 reports, you can select the categories or subsections printed within the report, such as time interval, job, user ID, subsystem, and so on. This helps you focus on those areas that experience extreme values and minimizes unnecessary paper in the report.
4. Because of the detail of the data collected with the trace option, it is even more important for you to select only the categories you want to review on the Print Transaction Report (PRTTNSRPT) command.

 For example, use the Component report to identify jobs with long response times, using unexpectedly high CPU utilization, or performing unexpectedly high synchronous disk I/Os. Print the transaction reports for only those jobs.
5. After reviewing the Transaction reports, you should have a good idea of which applications require further attention. Running PEX STATS at this time helps you focus on those applications. See either *Performance Tools/400*, SC41-4340, or subsequent chapters in this redbook for assistance on how to do this.
6. The reports produced by PEX STATS identify specific high resource usage tasks, processes, programs, and OS/400 modules. *Now you can weigh the cost against potential performance gains of any proposed changes you want to make*. Always record your changes and continue to monitor your system's performance.

Database design and application design are separate components involved when tuning your application.

Database design requires that you investigate your application to reduce or eliminate things such as:

- Too many logical files over physical files, which may lead to potential seize/lock conflicts.
- Inappropriate use of the dynamic select/omit function, which is resource intensive.
- Unnecessarily long keys.
- For SQL and other queries, ensure the proper indexes are built for the SQL or query statements being used. A thorough discussion of improving SQL and other query performance is beyond the scope of this redbook. A good source for performance tips on AS/400 SQL is the *DB2 for OS/400 SQL Programming* manual, SC41-4611.

Application design involves a broader perspective. To start a process, or job, the AS/400 system has to do work such as the following:

- Create open data paths (ODPs) for files.

- Initialize program variables.
- Activate programs.
- Perform housekeeping within the Process Access Group (PAG).

All of this work is done on behalf of the user requesting services and is necessary. However, it is possible to make changes in your application to use system functions more efficiently (for example, using shared file opens instead of full file opens, and reducing program calls within an application).

1.5.5 Program Tuning Tasks

If you have completed all application tuning tasks and you still are not satisfied with your system's performance, you need to look at the programs themselves. In particular, examine those that use an extensive amount of CPU time, do a lot of synchronous disk I/Os, have a wide variation in response times, show or demonstrate several long *exceptional waits*. An exceptional wait is a delay in performance that cannot be accounted for by CPU usage or the number of physical disk I/O operations. These waits are sometimes difficult to identify, but can be due to multiple jobs waiting for a database record (update operation), a message queue, or a data queue in use to be unlocked. Another potential cause of exceptional wait is the interruption of the currently running job by a job of higher run priority.

For program tuning, you may want to use the Performance Explorer′s PROFILE (PEX PROFILE option) to determine the relative amount of processing time spent in different parts of a program or set of programs. This is particularly necessary when a program's CPU time is equal to its cumulative CPU in the PEX STATS Statistics Information report. (For more information on the CPU and cumulative CPU times in the Statistics Information report, refer to the *Performance Tools/400*, SC41-4340, and subsequent chapters in this redbook. The PEX PROFILE commands are used to start, end, and print program execution information. PEX PROFILE does not provide data about total processing time used by a program, but it identifies high-leverage portions of a program for improvement.

Program tuning can require changing program source code. Different programming approaches apply to batch and interactive programs. Batch programs are likely to involve high volumes of data and, therefore, *must* have efficient DB access, calculations, and array processing. Interactive programs should, however, attempt to limit the number of disk accesses and the number of calls to other programs.

Finally, keep in mind that some person or persons within the customer organization must have responsibility (″ownership″) for management of the system′s resources. This is required even if they do not have detail knowledge of an application′s implementation. These are the people that need to understand what is running on the system and who to contact for each application for any performance management methodology or performance problem analysis to be successful.

1.5.6 Enhanced Performance Explorer Trace

The Enhanced PEX TRACE support documented in this redbook can be used to analyze application and program tuning possibilities. Consider using this Enhanced PEX TRACE when other performance tools have not been able to identify specific causes to poor performance.

Enhanced PEX TRACE is particularly helpful in identifying the following potential causes for poor performance:

- Excessive number of full file opens and closes on specific files.
- Excessive number of physical disk I/Os on specific objects.
- Excessive CPU utilization.
- Excessive number of Integrated Language Environment (ILE) program activations and deactivations.

 With a high level of program modularization, there exists the possibility that thousands of ILE program activations and deactivations are causing poor performance if the ILE programs are called thousands of time.

1.6 Requirements for Collecting PEX Data

PEX STATS and PEX TRACE (basic and Enhanced) data can be collected only for programs and procedures that have been *collection enabled*. This enablement actually places compiler generated hooks into the programs, ensuring that PEX STATS and PEX TRACE can collect information about them when they are run. The *enable performance collection* or ENBPFRCOL attribute on OPM (Original Program Model) and ILE (Integrated Language Environment) programs and modules determines the level of detail that is collected. Use the DSPPGM command to see the setting for programs on your system.

Figure 3 is an example of the *enable performance collection* value shown as part of the module information for ILE RPG program CSTBLDRE.

```
                        Display Program Information

Program  . . . . . :   CSTBLDRE      Library  . . . . . :   PFREXP

  Debug data . . . . . . . . . . . . . . . . . :   *YES
  Enable performance collection  . . . . . . . :   *PEP <<--
  Module created on  . . . . . . . . . . . . . :   V3R6M0
  Module created for . . . . . . . . . . . . . :   V3R6M0
  Object control level . . . . . . . . . . . . :
  User modified  . . . . . . . . . . . . . . . :   *YES
  Licensed program . . . . . . . . . . . . . . :
  PTF number . . . . . . . . . . . . . . . . . :
  APAR ID  . . . . . . . . . . . . . . . . . . :

                                                                    Bottom

Press Enter to continue.

F3=Exit   F12=Cancel
```

Figure 3. DSPPGM Example Showing Enable Performance Collection Parameter

Please refer to Table 1 on page 16 to see what the defaults are for each of the ILE compilers. Also, note that for OPM programs restored to RISC systems, the performance collection capability is implicitly enabled when the program is

retranslated. The OPM ENBPFRCOL setting is equivalent to Program Entry Procedure or PEP level in ILE.

*PEP-level performance statistics are gathered on the entry and exit of the program entry procedure only. Typically, this value is sufficient to gather overall performance information for an application. This support is equivalent to the support formally provided with the TPST tool. Early in V3R6 it was discovered that some High Level ILE Languages were defaulting to not enabling PEX performance data collection on their CRTxxxMOD and CRTBNDxxx commands. PTF MF11968 was issued in April 1996 and included in V3R6 Cumulative PTF packages beginning May 1996. After application of PTF MF11968, execution of any ILE compilation command specifying ENBPFRCOL(*NONE) results in ENBPFRCOL(*PEP) being used by the translator. This ensures that all ILE programs created after application of PTF 11968 are visible to PEX STATS and PEX TRACE.

PTF MF11968 is a V3R6 PTF. V3R7 contains the equivalent of MF11968 support. However, for V3R7, ILE RPG, ILE COBOL, ILE CL all support ENBPFRCOL(*PEP) as the default. (V3R6 ILE C already supported full ENBPFRCOL support and defaulted to *PEP.) On V3R7, ENBPFRCOL(*NONE) is not valid for any of the CRTxxxx commands for ILE C, ILE CL, ILE COBOL, and ILE RPG. See Table 1 for additional ENBPFRCOL considerations. *It is important to understand the ENBPFRCOL value when using PEX to collect performance statistics.*

Table 1. ENBPFRCOL Considerations

Program Type	ENBPFRCOL Default	Can We See ENBPFRCOL Setting?	Can We Change ENBPFRCOL Setting?
OPM RPG	ON[1]	No	No
OPM COBOL	ON[1]	No	No
OPM C	ON[1]	No	No
OPM CL	ON[1]	No	No
ILE RPG	*NONE/*PEP[2]	Yes[4]	Yes[5]
ILE COBOL	*NONE/*PEP[2]	Yes[4]	Yes[5]
ILE C	*PEP	Yes[4]	Yes[5]
ILE CL	*NONE/*PEP[3]	Yes[4]	Yes[5]

Notes:

1. OPM programs going through the translator on RISC have ENBPFRCOL turned on. This is equivalent to *PEP level in ILE. There is no ″display command″ to show you that *PEP is enabled.
2. Where you see two ENBPFRCOL values separated by the forward slash character (/), they represent first, V3R6, and second, V3R7 values.

 On V3R6, the ILE CRTRPGMOD, CRTBNDRPG, CRTCBLMOD, and CRTBNDCBL commands do not have the ENBPFRCOL keyword. ENBPFRCOL for these commands defaults to *PEP if the program/module is created after PTF MF11968 has been applied on V3R6. MF11968 has been on all cumulative V3R6 PTF packages since May 1996. If you created your program or module before MF11968 was applied, the default is ENBPFRCOL(*NONE). On V3R6, DSPPGM shows *NONE even if the program/module was created after MF11968 was installed. On V3R6, the only way to ensure *PEP is enabled is to do a CHGPGM ENBPFRCOL(*PEP) or re-create the program/module.

 In V3R7, things works differently. MF11968 is part of the base system and ILE RPG, ILE COBOL (and ILE CL and ILE C) all support the ENBPFRCOL parameter and all default to *PEP if created on V3R7. You can always do a CHGPGM ... ENBPFRCOL(*PEP) to ensure data collection is enabled.
3. In V3R6, CRTCLMOD and CRTBNDCL ENBPFRCOL default to *NONE. If MF1168 has been applied, a CRTCLMOD or CRTBNDCL defaults to *PEP even if ENDPFRCOL(*NONE) is specified.

 In V3R7, ENBPFRCOL(*PEP) is the default.
4. DSPPGM or DSPMOD shows the ENBPFRCOL setting of ILE programs or modules.

 If you create the program or module after MF11968 has been installed and take the language dependent defaults for ENBPFRCOL, the program or module has ENBPFRCOL(*PEP). For V3R6, ENBPFRCOL(*NONE) may show on the DSPPGM program module information, but *NONE is equal to *PEP.
5. The CHGPGM command, which only works on ILE programs, can be used to change the ENBPFRCOL setting if the program template is available.

 You can specify *PEP, *FULL, or *ENTRYEXIT, or for ILE C, additional levels of detail for PEX performance collection.

 Once the program/module has been created with at least *PEP, you may specify CHGPGM ENBPFRCOL(*NONE), but in reality, *NONE is never in effect. *PEP is the ″simplest″ level of PEX collection data in effect. This is true even if DSPPGM module level information shows ENBPFRCOL(*NONE).

ENBPFRCOL Parameter: CPU Impact and Call Level Caution

If the application environment is such that a large number of ILE program/module/procedures are being called per second, running a PEX collection may cause a serious performance degradation if ENBPFRCOL(*ENTRYEXIT) or ENBPFRCOL(*FULL) or more detailed ILE C ENBPFRCOL values have been specified. Note that CHGPGM can set ILE RPG and ILE COBOL ENBPFRCOL values to *FULL and *ALLPRC (trace all internal procedures and external procedure calls).

*FULL or more detailed ENBPFRCOL values may produce a confusing *number of times called* counts and call level numbers for simple ILE RPG or ILE COBOL programs because both the call to the program and the compiler-generated call to the program entry procedure are counted. This may be ″normal″ for an ILE C programmer, but a traditional RPG or COBOL programmer may be puzzled over call counts or call level numbers compared to actual source program calls.

We strongly recommend *PEP be used and output understood before requesting a more detailed level of program and procedure data collection.

1.7 PEX Implementation - Diagrammatic Overview

The remainder of this redbook assumes it has been determined that the Performance Explorer capabilities must be used to analyze one or more performance problems, and that the focus is on application and application program analysis.

Figure 4 on page 19 is an internal look at how the collection of PEX performance data works. Above the Machine Interface boundary (MI Boundary), you can see the following two jobs:

1. A job issuing the PEX commands to define and collect PEX performance data (ADDPEXDFN, STRPEX session, then ENDPEX session).
 - ADDPEXDFN defines the type of PEX data to collect (STATS, PROFILE, or TRACE), and assigns a name to this definition that is used by the Start PEX session (STRPEX) command.
 - STRPEX starts the PEX data collection process.
 - ENDPEX ends the PEX data collection process; this causes the PEX collected data to be placed into the QAYPExxx database files.
2. A second job that is having PEX data collected for it.

Note that PEX, which runs above the MI, provides the capability to specify what data to collect, what jobs should have data collected, and the type of collection to be made. However, it is the Performance Data Collector (PDC) implemented in SLIC that actually performs the collection that PEX requested.

In this snapshot of time, the job being tracked by PEX is running an application program that has issued a READ operation to a database file already opened. This program READ operation calls the OS/400 database data management program/module QDBGETSQ (DataBase Get Sequential).

QDBGETSQ uses the MI Complex (MICMPLX) instruction Retrieve Data Space Entry (RETDSEN) to request the record that was read by the application program.

Hypothetical Licensed Internal Code (LIC) module names starting with the character '#' are used throughout this example.

- RETDSEN calls the LIC module #dbread.

 LIC is hardware level microcode and is sometimes also referred to as System Licensed Internal Code (SLIC).

In Figure 4 you see the following tasks occur **below the MI Boundary**:

- The LIC #dbread module issues a request to LIC Storage Management to retrieve the record through a Segment Address Range (SAR) read operation ?SAR(READ).

 Remember, OS/400 thinks the data is in virtual storage and is not aware of whether the data is in main storage or on auxiliary (disk) storage. A segment is a "chunk" of virtual storage that contains all or part of an object, such as a program or data. The data in this example is the actual customer data portion (data space) of a database file. In this example, the data is actually on auxiliary storage.

- The LIC ?SAR(READ) operation calls the LIC storage management function to perform the SAR READ request (#sm_do_SAR). #sm_do_SAR determines the data is not already in main storage and requests a physical read of a disk through dasd_read**();** and calls LIC task #sm_dasd_rd to read the data from disk.

- LIC #sm_dasd_rd performs the actual physical disk I/O read operation to read the originally requested data.

- The LIC Performance Data Collector (PDC) Manager tasks collect PEX data as requested, based upon the specified ADDPEXDFN definition to collect and record PEX data.

 You can see the PEX data collection trace points where information is collected at **1**, **2**, **3**, and **4** at the darkened circles.

 The PDC data collection is first placed into PDC collection areas on DASD segments. The PEX collection data ends up in the PEX AS/400 database files (prefix QAYPExxxx) as part of the ENDPEX DTAOPT(*LIB) command processing as shown at **6**.

The SMTBCH command is available only with the Enhanced PEX TRACE support. It provides PEX TRACE options not available with the standard PEX TRACE support. With SMTBCH, the PEX collection process can be run either interactively or in a submitted job. SMTBCH also provides an optional Enhanced PEX TRACE menu for producing PEX TRACE reports that are not available with the standard PEX TRACE support.

Enhanced PEX TRACE support is introduced in this redbook in Chapter 6, "Performance Explorer *TRACE Option" on page 125.

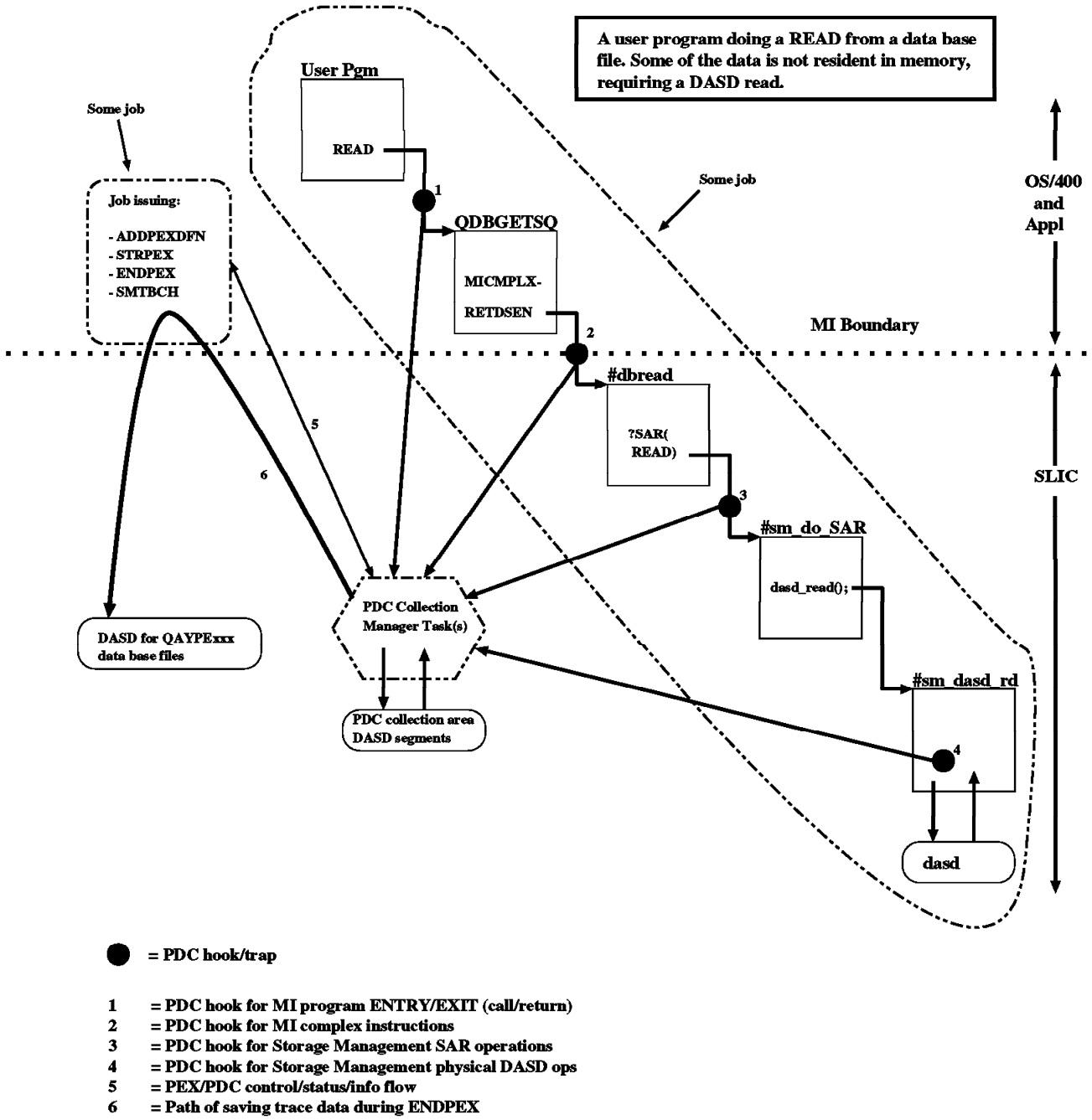


Figure 4. Overview of PEX Implementation

The remainder of this redbook provides more information and examples on using the three PEX functions (STATS, PROFILE, and Enhanced TRACE). We assume that the reader has gone through the performance management methodology and determined that PEX functions should be used.

Notes:

1. Rochester development lab has chosen not to document the functions performed within the LIC routine names shown in this example (for example, those programs beginning with the # character).
2. There is always a possibility of a system software or hardware problem being the root cause of a performance problem. In some cases the system

software detects that this is occurring, and places messages in the system History Log or in hexadecimal format within the VLOG. You may also be getting recoverable hardware errors, which are logged in the System Error log. If you have difficulty identifying a cause for poor performance, ensure that you review these logs.

- To view the system History Log, use the OS/400 Display Log (DSPLOG) command and specify LOG(QHST).
- To view the VLOG, use the OS/400 Start Service Tool (STRSST) command and select the options to *Start a service tool*, followed by selecting the *Licensed Internal Code log* option.
- To view the System Error log, use STRSST, start a service tool, and select the *Product Activity log* option.
- To print the System Error log, use the OS/400 Print Error Log (PRTERRLOG) command.

The *Licensed Internal Code Diagnostics Aid* manual, LY44-4900, provides assistance in using the Start Service Tool (SST) and Dedicated Server Tool (DST) functions for VLOG, LIC log, and Product Activity log review.

Chapter 2. Running the Performance Explorer

This chapter summarizes the three types of data collected by the Performance Explorer. It also provides an overview of how to define the type of data collection, collect the data, and produce reports from the collected data.

2.1 Overview of PEX Collection Types

PEX provides the following three types of performance data collection:

- PEX STATS

 PEX STATS collects CPU utilization and physical disk (DASD) I/O counts of **programs** or **modules** that run during the collection period. These programs or modules may be IBM operating system modules and tasks, or application programs or modules.

 You use STATS to find the *high resource-consuming* programs and modules that run during the performance collection. The objective is to determine if there are specific programs or modules doing most of the resource consumption. If you suspect that an application implementation problem is the reason for poor performance, STATS collection enables you to determine which programs should be examined, based upon the CPU and disk statistics and the number of times the program has been called.

 For example, you may find that the highest CPU utilization program or module is called only once during the collection period. You may have another program or module that uses a moderately high level of CPU utilization, but is called hundreds of times. You need to decide if the program or module that is called only once should be further analyzed, or you may choose to do further analysis on the program or module that consumes a moderately high level of CPU utilization but is called hundreds of times.

- PEX PROFILE

 Once you have identified a high resource-consuming program or module and want to do further performance analysis, you can use PROFILE to find the *hot spots* (high CPU usage sections of instructions) within the program according to the High Level Language (HLL) **source statement numbers**. If the program or module is IBM-provided, you can report this to IBM software service. If the program or module is provided as part of a purchased application, you can report this to the application provider.

 If you have access to the application program or module source, you might find that analysis of these HLL source statements lead you to make changes, such as redefining data types, writing a more efficient algorithm to process required data, or even choosing to implement the function in a more efficient programming language to process the required data. For example, an RPG program could call an ILE C/400 program rather than another RPG program to process financial data more efficiently.

 PROFILE output analysis may also identify a program that is constantly branching between the start of the program and subroutines at the end of the program. If the program is large enough, this constant jumping back and forth could cause excessive page fault rates on a system with limited main storage.

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- PEX TRACE

 You might find that all other performance tools analysis still does not identify places where an application implementation appears to be the cause of a performance problem.

 In these cases, where Enhanced PEX is not installed on your system, IBM software support may direct you to collect PEX TRACE data and send that data back to IBM for additional detailed analysis.

 As shipped with OS/400 and Performance Tools/400, PEX TRACE support is meant for use only through IBM Software Support.

- Enhanced PEX TRACE

 If you have the Enhanced PEX TRACE PTFs installed, as described in Table 3 on page 127 and Table 4 on page 130,
 you can analyze the following possible causes for poor performance:

 – Excessive file opens and closes by file, by job, by program.

 – Excessive ILE program activations and deactivations by job and by program.

 – Excessive CPU utilization or disk I/Os by job, by program, by object.

 – Jobs or programs causing excessive page faulting.

The remainder of this chapter presents an overview of how to define a PEX definition type, start and end the PEX collection session, and print a PEX report on the collected data. The following chapters in this redbook discusses specific usage of the STATS, PROFILE, and TRACE capabilities.

For an explanation of all the statistics and column headings that appear on the Performance Explorer reports for each collection type, refer to *Performance Tools/400*, SC41-4340.

The PEX collection cycle is made up of the following activities:

1. Determine the type of collection needed, and create a PEX definition with the Add Performance Explorer Definition (ADDPEXDFN) command.

 On ADDPEXDFN, specify the collection type and a name for the definition. This definition is stored as a database member by that name in the QAPEXDFN file in library QUSRSYS. The PEX definition name is used on the Start PEX Collection command.

2. Determine the application environment for which you want to collect data and start the collection during that environment.

 Use the Start Performance Explorer (STRPEX) command to start the collection. On STRPEX, specify the PEX definition to be used and a PEX collection session id that is assigned to the active PEX collection activity. You use this session id on the End PEX Collection command.

 Note: There can be only one PEX collection session active at a time. This is because a PEX collection always involves all system tasks, and an individual task or job cannot be present in more than one collection at the same time.

3. End the PEX collection session when you have completed the application processing.

 Use the End Performance Explorer (ENDPEX) command to stop the collection. Specify the PEX collection session name (SSNID parameter) that was

specified on the STRPEX command. ENDPEX takes the following actions on the collected data:

a. Places the collected PEX data in files QAYPExxx in a library of your choice.

 Use OPTION(*END) and DTAOPT(*LIB) to do this. The database member name for all the QAYPExxx files defaults to session name, but can be any name you choose on the DTAMBR parameter.

 This is the option typically taken.

 You may specify RPLDTA(*YES) to erase already collected data under this session name or RPLDTA(*NO) to add this collected data to data already collected.

 Unless you are a very sophisticated user of PEX collection data we recommend using RPLDTA(*YES).

b. Places the collected data into a single IBM-defined file.

 Use OPTION(*END) and DTAOPT(*FILE) to do this. Typically, you would use *FILE only under the direction of an IBM service representative. By default, the 9 member file that this creates has the same name as the collection session id and is created in library QPEXDATA.

c. Discards the collected data.

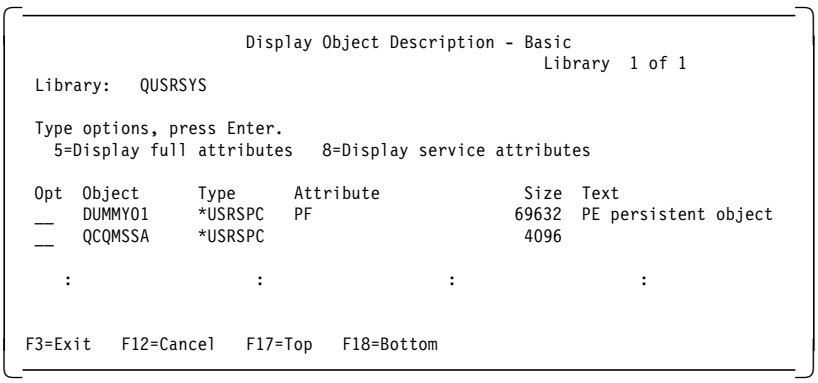
 Use OPTION(*END) and DTAOPT(*DLT) to delete any collected data. You do this when you determine the collected data cannot be used. For example, one of the suspected jobs encountered an unanticipated error or did not start as expected.

d. Suspends the collection session, but does not end it.

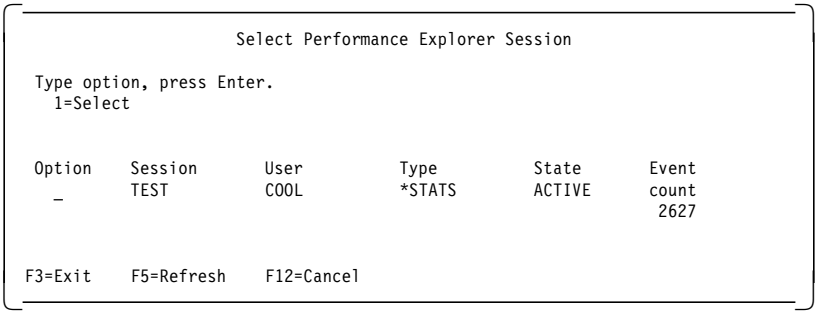
 Use OPTION(*SUSPEND) to do this. You may later restart data collection by issuing the STRPEX command with OPTION(*RESUME) for the named session id.

 If you forget the active PEX collection session name, you cannot end the PEX collection without powering off the system. There are two ways to determine the active PEX session name.

 - On either V3R6 or V3R7, you can use the Display Object Description (DSPOBJD) command for a *user space* type object in library QUSRSYS. Look for a Text field that contains "PE persistent object" as shown in the following example:



 - On V3R7, you can use ENDPEX SSNID(*SELECT), which finds the active PEX session and displays it as shown in the following example:



Select the session and ENDPEX is run.

4. Prints a PEX report on the collected data and review the output.

 Use the Performance Tools/400, 5716-PT1, licensed program Print Performance Explorer Report (PRTPEXRPT) command to do this. On PRTPEXRPT, specify the PEX collected data *member name* (ENDPEX DTAMBR parameter) and library name. PRTPEXRPT also requires you to specify PEX collection type (*STATS, *PROFILE, *TRACE) and the order (descending or ascending) in which the data is to be printed.

See Figure 5 on page 25 for a graphic representation of the PEX collection cycle support.

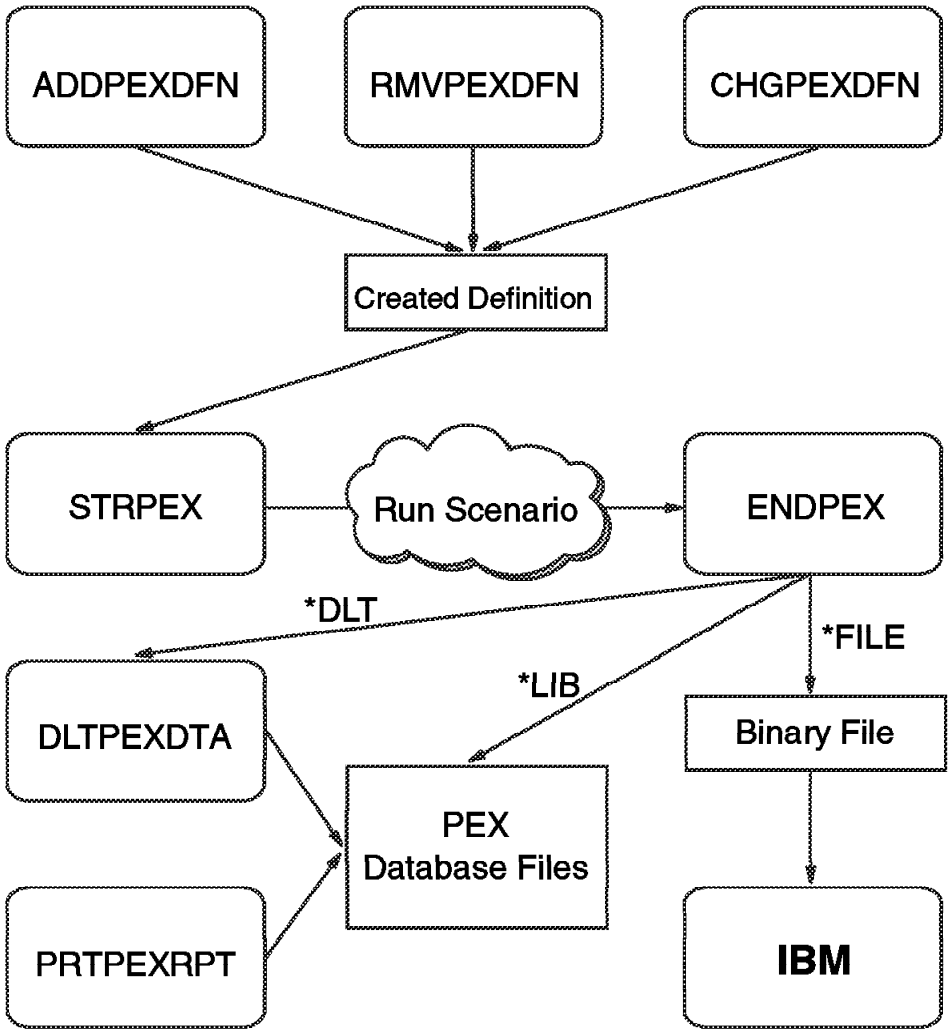


Figure 5. PEX Command and Processing Overview

RMVPEXDFN can be used to *remove* (delete) the PEX definition (the member in file QAPEXDFN in library QUSRSYS is removed).

CHGPEXDFN can be used to changed the PEX definition. Typically you would not change the TYPE (*STATS, *PROFILE, *TRACE), but you might change job names and, for PROFILE, programs.

DLTPEXDTA deletes the PEX data collected for the named database member name (DTAMBR keyword). The DLTPEXDTA DTAMBR name must match one previously specified on the ENDPEX DTAMBR parameter.

DLTPEXDTA removes the members in the various QAYPExxxx database files used to contain the collected PEX data.

If you cannot remember your PEX data collection name, you can do the following to see all the PEX collections (PEX member names) within a library:

```
DSPFD library-name/QAYPEBASE *MBRLIST
```

PRTPEXRPT must specify the DTAMBR name and library name containing the QAYPExxx database files, and it must specify the same PEX TYPE (*STATS, *PROFILE, or *TRACE) specified in the ADDPEXDFN or CHGPEXDFN command for the definition used on the STRPEX command.

Depending on the TYPE value, the report can be sorted on different values, such as CPU or disk I/Os for *STATS, or program or module name or statement number for *PROFILE.

2.2 PEX Collection Example

The following is a simple example of collecting PEX *STATS data for all jobs. It was run for 2 minutes and 48 seconds during a time when the system had a light workload.

```
ADDPEXDFN  DFN(TEST) TYPE(*STATS)
 1         JOB(*ALL) DTAORG(*FLAT) MRGJOB(*YES)
           TEXT('PEX EXAMPLE all active jobs')

STRPEX SSNID(RBEXAM) DFN(TEST)
 2


The same user-defined command
is run twice.  This command - CMDCSTPEX was run from
another job at the same time.

CMDCSTPEX CSTMBR(CSTFIL) ITMMBR(ITMFIL) LIBMBR(PFREXP)
CMDCSTPEX CSTMBR(CSTFIL) ITMMBR(ITMFIL) LIBMBR(PFREXP)
 3

ENDPEX SSNID(RBEXAM) OPTION(*END)
 4      DTAOPT(*LIB) DTALIB(PEXAMPLE) DTAMBR(*SSNID) RPLDTA(*NO)
        TEXT('TEST FOR RB CMDCSTPEX 2 x from 2 jobs (*ALLJOBS)')


 PRTPEXRPT MBR(RBEXAM) LIB(PEXAMPLE) TYPE(*STATS)
           STATSOPT(*CPU *PROGRAM) ORDER(*DESCENDING)
```

Figure 6. Running a PEX Collection Example

ADDPEXDFN (1) defines an *STATS performance definition for all jobs running on the system. The collected data does not include the parent-child (call/return sequence) because DTAORG(*FLAT) was specified. All jobs active on the system has data collected.

The PEX collection is started (2), using PEX definition TEST and PEX collection session name of RBEXAM.

CMDCSTPEX (3) is a user-defined command that calls program CSTPEX, which reads sequentially from one file and randomly from another file, and writes the results to the requesting display device.

ENDPEX (4) ends the PEX data collection session RBEXAM and stores the collection data in several QAYPExxx files in library PEXAMPLE. Each member of the QAYPExxx files has a name of RBEXAM.

PRTPEXRPT (**5**) produces a PEX *STATS report from the QAYPExxx file member names of RBEXAM in library PEXAMPLE. The PEX STATS output is summarized by CPU consumption for each program called and sorted in descending sequence (highest CPU consumption first). Each printed PEX report contains the following sections:

- **PEX Definition Description**
- **PEX Run (data collection session) Information**
- **PEX Library Section**
- **Collection Task Information**
- **Collection Type (Statistics, Profile, Trace) Specific Information**

The following figures are examples of the PRTPEXRPT sections that appear for both *STATS and *PROFILE data collection types.

The information under the sections that are included on all collection type reports contains slightly different information. The Collection Type Specific Information is significantly different for each type (*STATS, *PROFILE, *TRACE).

The following topic uses an *STATS collection type as an example. More specific *STATS information is contained in Chapter 3, “Performance Explorer *STATS Option” on page 35.

2.2.1 PEX Report Standard Sections Example

This topic shows the report for the PEX *STATS collection shown in Figure 6 on page 26.

```
                              Performance Explorer Report                    1/13/97 11:02:58
                                Definition Information                             Page
                                                                                      1

Library . . : PEXAMPLE
Member. . . : RBEXAM
Description : TEST FOR RB CMDCSTPEX 2 x from 2 jobs (*ALLJOBS)
Type . . . . . . . . . . . . : STATISTICS
Definition Name. . . . . . . : TEST
Defined By . . . . . . . . . : COOL
Definition Description . . . : PEX EXAMPLE all active jobs
Data Organization. . . . . . : FLAT
Overhead Subtraction . . . . : YES
Merge Jobs . . . . . . . . . : YES
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *ALL       *ALL       *ALL
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
```

*Figure 7. PRTPEXRPT, *STATS Definition Information Example*

Figure 7 shows the *Definition Information* section that summarizes the actual PEX definition used to collect the data. In this example you can see that TEST is a Type STATISTICS, defined by user id COOL.

Figure 8 on page 28 shows the *Run Information* section, which summarizes the actual PEX collection run-time information.

```
Library . . : PEXAMPLE
Member. . . : RBEXAM
Description : TEST FOR RB CMDCSTPEX 2 x from 2 jobs (*ALLJOBS)
Sessions since IPL. . . . . :                          2
Session name. . . . . . . . . . . . . . . : RBEXAM
Start time. . . . . . . . . . . . . . . . : 1997-01-13-10.58.32.238232
Stop time . . . . . . . . . . . . . . . . : 1997-01-13-11.01.20.538712
Total time  DD-HH.MM.ss.uuuuuu. . . . . :         00-00.02.48.300480
Suspend time (us) . . . . . . . . . . . . :                  330,272
Number of events. . . . . . . . . . . . . :                   99,612
Trace wrap count. . . . . . . . . . . . . :                        0
Job creating session. . . . . . . . . . . : QPADEV0021COOL      068209
Started by user . . . . . . . . . . . . . : COOL
Target system . . . . . . . . . . . . . . : ITSM05   1
Serial number . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . :                   98,304  2
OS/400 level. . . . . . . . . . . . . . . : 50N
Version . . . . . . . . . . . . . . . . . : V3R6M0
Configured ASPs . . . . . . . . . . . . . :                        1
Logical DASDs . . . . . . . . . . . . . . :                        7
Data areas. . . . . . . . . . . . . . . . :                        1
Jobs/tasks in session . . . . . . . . . . :                      267
Jobs in session . . . . . . . . . . . . . :                       97
```

Figure 8. PRTPEXRPT, STATS Run Information Example

The Run Information sections shows the start, stop, and total run times of the PEX collection. In this example, the PEX collection *session* ran for approximately 2 minutes and 48 seconds (02.48.300480). You also see that job 068209/COOL/QPADEV0021 ran the PEX collection on system ITSM05. Starting at **1** you can see some hardware and software information about the system on which PEX data was collected.

Sessions since IPL is the number of times the Performance Explorer has collected data since the last IPL. In this case we have run PEX twice.

At **2** you see *Total pages memory*, which is in units of 4K bytes. 98,304 means 384MB of main storage.

1. 98,304 / 1024(1K) = 96
2. 96 * 4 = 384

Logical DASDs means the physical number of disk drives attached to the system if mirroring is not used. In our example system - ITSM05, we know from other reports we actually have 8 physical disks attached to the system. The two on the MFIOP (9162) are mirrored and the other 6 are RAID-protected, yielding a logical DASD count of 7.

Data areas has a value of 1 because on our ADDPEXDFN for TEST, we specified MRGJOB(*YES). MRGJOB(*YES) specifies to store the collected data for all jobs in a combined data area.

Figure 9 on page 29 shows the *Library Section*, which summarizes the CPU and Disk I/O activity at the library level.

```
                                        Library Section
Library . . . : PEXAMPLE
Member. . . . : RBEXAM
Description : TEST FOR RB CMDCSTPEX 2 x from 2 jobs (*ALLJOBS)
                          +---------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX             CPU        DB    DB   NDB   NDB             CPU        DB    DB   NDB   NDB  Call
Name        Called    Made  Issued         (us) /   %    SIO   AIO   SIO   AIO         (us) /   %    SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
PFREXP          24   20256      11     18,496,006 61.4      0     0     7     2     43,080,237 ****    152  1334    62     5     0
**Unknown        0       0       0      7,065,679 23.4      0     0     0     0      7,065,679 23.4      0     0     0     0     0
MI CPLX      26304       0       0      2,539,090  8.4     76   667    43     4      2,539,090  8.4     76   667    43     4     0
QSYS         22338    1507   25854      1,436,621  4.8      0     0    56     0      4,862,988 16.1     95   667   338    13     0
**LIC Task       0       0       0        564,975  1.9      0     0     0     0        564,975  1.9      0     0     0     0     0
QTCP           263     192     262         23,593  0.1      0     0     0     0         93,615  0.3      0     0     0     0     0
QIJS            12     189       6         15,409  0.1      0     0     0     0        275,413  0.9      0     0     2     0     0
QBRM             3       9       0            756  0.0      0     0     0     0         15,819  0.1      0     0     0     0     0
```

*Figure 9. PRTPEXRPT, *STATS Library Section Example*

The *Library Section* identifies the libraries that contained the programs or modules that were active during the collection period.

All CPU usage and disk I/O operation statistics for all the programs or modules in a specific library are totaled for that library. Note that it is common to have a cumulative CPU percent total be higher than 99.9%. In those cases, you see a CPU percent value of ********. This is considered normal in most cases.

We discuss more about the values in the headings *Inline Stats* and *Cumulative Stats* in Chapter 3, “Performance Explorer *STATS Option” on page 35.

If you notice a single library with a high level of CPU utilization or DASD I/Os, you might want to focus on programs in that library.

In this example, you see library PFREXP, where the programs and data accessed by the user-defined command CMDCSTPEX reside. We also captured the following libraries:

- **QSYS**, where most of the OS/400 modules are stored.
- **QTCP**, which provides TCP/IP support. In particular, our two interactive workstation jobs used TCP/IP Telnet 5250 support.
- **QIJS**, which provides Job Scheduler for OS/400, Licensed Product Program 5716-JS1, support.
- **QBRM**, which provides Backup Recovery and Media Services, Licensed Product Program 5716-BR1, support.

PEX was unable to identify a library for approximately 7.066 seconds (7 065 679 seconds) of CPU seconds.

MI CPLX represents all the high level machine interface (complex) instructions used by OS/400 support.

MI complex instructions are machine instructions to the AS/400 Machine Interface issued by the Operating System to do its normal work. MI complex instructions include functions like finding the pointer to an object (*MATPTR - materialize pointer), writing records sequentially to a file (*INSSDSE - insert sequential data space entries), converting a character value to numeric (*CVTCN,LB - convert character to numeric), creating a duplicate object (*CRTDOBJ - create duplicate object), and so on.

Refer to Figure 4 on page 19 for a Retrieve Data Space Entry (RETDSEN) MI Complex Instruction example. Section 3.3.2, “MI Complex Instructions” on

page 54 discusses some relationships between OS/400 functions and MI Complex Instructions.

Figure 10 on page 31 shows the *Task Information* section, which lists all the LIC tasks and OS/400 jobs that were started during the PEX collection. If the task or job did meaningful work during the collection time period, values under the headings *Run Time (us)* (microseconds) and *Run Time Percent* contain non-zero values.

```
Library . . : COOK
Member. . . : RBEXAM
Description : TEST FOR RB CMDCSTPEX 2 x from 2 jobs (*ALLJOBS)
```

Task ID	Job/Task Name		Pool	Priority	Existence Start	Existence End	Elapsed Time (us)	Run Time (us)	Run Time Percent	
688	QPADEV0006	COOK	068210	4	160	Y	Y	166671048	16179896	47.72
687	QPADEV0021	COOK	068209	4	160	Y	Y	166671056	16416096	48.41
685	PA-T-P23ARVYBC			1	40	Y	Y	166671056	0	0
684	P23ARVYB	AS0219R	068207	2	160	Y	Y	166671056	0	0
683	T2-P23ARVYB			1	75	Y	Y	166671056	0	0
486	T2-TPMAATTA			1	75	Y	Y	166671056	0	0
394	QTFTPO0158	QTCP	068163	2	165	Y	Y	166671056	0	0
383	VTMTS1			1	75	Y	Y	166671056	19456	0.06
382	QESTP	QSRVBAS	068154	2	180	Y	Y	166671056	0	0
381	QNFTP	QSNADS	068153	2	180	Y	Y	166671056	0	0
380	QDIAHSTPRT	QSNADS	068152	2	190	Y	Y	166671056	0	0
379	QDIAINDUSR	QSNADS	068151	2	190	Y	Y	166671056	0	0
378	QDIALOCAL	QSNADS	068150	2	160	Y	Y	166671056	0	0
377	QDIA	QSNADS	068149	2	180	Y	Y	166671056	0	0
376	QSNMPSA	QTCP	068148	2	175	Y	Y	166671048	0	0
375	QPWFSERVSD	QUSER	068147	6	160	Y	Y	166671056	0	0
374	PRTASM01	QSPLJOB	068146	3	190	Y	Y	166671056	0	0
373	JUNK	QSPLJOB	068145	3	190	Y	Y	166671056	0	0
372	LANPRINT	QSPLJOB	068144	3	155	Y	Y	166658088	0	0
371	QTLPD01553	QTCP	068143	2	165	Y	Y	166658096	0	0
370	QTSMTPBRSR	QTCP	068142	2	190	Y	Y	166658088	0	0
369	QTSMTPBRCL	QTCP	068141	2	190	Y	Y	166658096	0	0
368	QTSMTPCLNT	QTCP	068140	2	190	Y	Y	166658088	0	0
367	QTLPD01521	QTCP	068139	2	165	Y	Y	166658096	0	0
365	QTFTPO0215	QTCP	068137	2	165	Y	Y	166658088	0	0
364	QTFTPO0192	QTCP	068136	2	165	Y	Y	166658096	0	0
363	QTMSNMPRCV	QTCP	068135	2	190	Y	Y	166658096	0	0
362	QTSMTPSRVR	QTCP	068133	2	190	Y	Y	166658088	0	0
361	X2507	QSNADS	068134	2	180	Y	Y	166658096	0	0
360	X2506	QSNADS	068132	2	180	Y	Y	166658096	0	0
359	TARGET2	QGATE	068130	2	180	Y	Y	166658096	0	0
358	QTFTPO0851	QTCP	068131	2	165	Y	Y	166658096	0	0
357	TARGET1	QGATE	068129	2	180	Y	Y	166658096	0	0
356	QBRMNET	QPGMR	068128	2	170	Y	Y	166658096	20992	0.06
:	:		:	:	:	:	:	:		
:	:		:	:	:	:	:	:		
292	IPR0060103--2619			1	10	Y	Y	166647640	0	0
291	SK-ASC008P			1	70	Y	Y	166647640	0	0
290	SK-ASC007P			1	70	Y	Y	166647632	0	0
289	SK-ASC006P			1	70	Y	Y	166647632	0	0
288	IPR3050103--2619			1	10	Y	Y	166647632	0	0
287	IPR2050103--2619			1	10	Y	Y	166647632	43296	0.13
286	IPR1050103--2619			1	10	Y	Y	166647632	0	0
:	:		:	:	:	:	:	:		
221	DBIO03			1	160	Y	Y	166640400	0	0
220	DBIO02			1	160	Y	Y	166640400	0	0
219	DBIO01			1	160	Y	Y	166640400	0	0
218	DBIO00			1	160	Y	Y	166640400	0	0
217	DBL307			1	160	Y	Y	166640400	0	0
216	DBL306			1	160	Y	Y	166640400	0	0
215	DBL305			1	160	Y	Y	166640400	0	0
214	DBL304			1	160	Y	Y	166640400	0	0
:	:		:	:	:	:	:	:		
68	SMASPTASK			1	10	Y	Y	166625920	0	0
67	LIDMGR-TASK--AHT			1	15	Y	Y	166625920	0	0
66	RMSRVCTKLO			1	40	Y	Y	166625920	0	0
1	CFINT1			0	0	Y	Y	166681656	187792	0.55

*Figure 10. PRTPEXRPT, *STATS Task Information Example*

In this example, you see that task IDs **688** and **687** (jobs 068210 and 068209) had the highest run time and run-time percents. These are the jobs that ran the user-defined command CMDCSTPEX.

In most cases, you do not need to understand the LIC tasks that are active when doing performance problem analysis for an application or application program.

Explaining all the task or job names included in this Task Information example is beyond the scope of this manual. However, the following task, job, and run priority explanation is included to help you understand what is going on during the PEX collection run time.

Priority values shown do not correspond to the OS/400 Class Description object run priority (RUNPTY) parameter value. However, for OS/400 jobs with priority values of 1-99, you can subtract 140 to correspond to the RUNPTY value. For example, the interactive workstations jobs 068210 and 068209 show priority of 160. If you subtract 140 from 160, you get the value of 20. RUNPTY(20) is the normal default for interactive jobs.

For job 068144 (a spooled writer job), you can subtract 140 from priority 155 and get RUNPTY 15, which is a typical priority for OS/400 spooled writer jobs (class QSPL).

For LIC (Licensed Internal Code) tasks, the priorities are assigned by IBM development and the user has no ability to change them. In most cases LIC task priorities are higher than OS/400 jobs (tasks), though some LIC tasks run at the same priority as the user job for which they are performing a function. LIC priorities are relative to each other, just as OS/400 RUNPTY values are for OS/400 jobs.

For example, a LIC task such as the APPC station IOM task, indicated in the *Task Information* section of the report by a *"*T2-*"* prefix, followed by the APPC control unit name, runs at priority 75. However, the LIC line IOM (I/O Manager) **I**nter-**P**rocess multiple **R**outer tasks, indicated by the prefix IPR and ending with the IOP feature number (such as 2619), run at priority 10!

The disk drive tasks that start with prefix DBI or DBL typically run under the RUNPTY value of the OS/400 job they are performing the function for.

LIC task **CFINT1** is a centralized interrupt handler that is the highest priority task on the system. There is one CFINTn task for each processor on a system. For example, the 530-2162 is a 4-way system and would list tasks CFINT1 through CFINT4.

In Figure 10 on page 31, the following task IDs are examples of the jobs and tasks we have just described.

668
687
372
683
486
288
287
286
219
218
217
216
1

You can identify a SLIC task by observing that it runs in pool 1, the machine pool, except CFINT, which runs in pool ″0″ (its own pool).

Most of the SLIC tasks are defined in *AS/400 Licensed Internal Code Diagnostics Aids - Volume 1*, LY44-4900. Refer also to Appendix C, “AS/400 LIC Tasks (Partial List)” on page 485 for a list of many of the LIC tasks.

V3R6 and V3R7 PEX Database File Compatibility

Note, the V3R6 and V3R7 PEX *STATS, *PROFILE, and *TRACE collected data are not directly compatible between V3R6 and V3R7. PEX data collected on V3R6 can be restored to V3R7; however, the V3R7 PRTPEXRPT command issues an error message when processing V3R6 data.

The V3R6 PRTPEXRPT command fails if run over V3R7-collected PEX data.

You may ″convert″ PEX *STATS or PEX *PROFILE from V3R6 format to V3R7 format using the following steps.

Assumptions

- The following command sequence is performed on a V3R7 system.
- The library containing the V3R6 PEX data (QAYPExxxxx files) on the V3R7 system is PEXV3R6.
- The library to contain the converted V3R6 PEX files is called PEXV3R7.

1. Run a PEX collection of any type (we suggest using *STATS FLAT over just one job).
2. Issue the PRTPEXRPT command to build the V3R7 QAYPExxxxx files in library PEXV3R7.

 File QAYPERLS is created in library PEXV3R7; this file did not exist for V3R6 PEX and determines the release level for the PEX data collection library.
3. Use the Work with Files command (WRKF) to obtain a list of all the QAYPExxxxx files in library PEXV3R6.
4. Use Copy File (CPYF) command to copy all the members from the PEX files in library PEXV3R6 into library PEXV3R6. Run the CPYF command for **all** of the QAYPExxxxx physical files in library PEXV3R6. An example of copying file QAYPESTATS is now shown below:

   ```
   CPYF FROMFILE(PEXV3R6/QAYPESTATS) TOFILE(PEXV3R7/QAYPESTATS)
   FROMMBR(*ALL) TOMBR(*FROMMBR) MBROPT(*ADD) CRTFILE(*NO) FMTOPT(*MAP)
   ```

You can run PRTPEXRPT against the required collection member in library PEXV3R7.

PEX *TRACE data (including Enhanced PEX TRACE support) cannot be made compatible between V3R6 and V3R7.

Chapter 3. Performance Explorer *STATS Option

This chapter provides more detailed analysis of PEX Statistics (*STATS) capabilities. It compares PEX STATS support to other performance tools and provides assistance in interpreting the PRTPEXRPT reports for *STATS definitions.

The activity sequence for collecting PEX STATS data and reviewing a report on the collected PEX STATS data is as follows:

1. Define a PEX statistics definition via the ADDPEXDFN command, specifying TYPE(*STATS).
2. Start a PEX collection session with the STRPEX command, specifying your STATS PEX definition.
3. Run the appropriate application programs.
4. When sufficient processing has completed, end the PEX collection session with the ENDPEX command. Assuming you want to use the collected data for later reporting, specify OPTION(*END) DTAOPT(*LIB) DLTLIB(your library name or QPEXDATA) DTAMBR(your member name or default to the session name with *SSNID). You can replace or add to data already collected under the same DTAMBR name with the RPLDTA parameter and you can supply a meaningful description of the collected data.

 For example:

   ```
   ENDPEX SSNID(active session name) OPTION(*END) DTAOPT(*LIB)
          DTALIB(your library name) DTAMBR(*SSNID) RPLDTA(*YES)
          TEXT('PAYROLL: End of month processing')
   ```

5. Print the PEX report for STATS collected data using the Performance Tools/400 PRTPEXRPT command.

 For example:

   ```
   PRTPEXRPT MBR(collected session name or your name)
             TYPE(*STATS) LIB(your library)
             STATSOPT(*CPU *PROGRAM)
             ORDER(*DESCENDING)
   ```

Figure 11 on page 36 is an example of a PEX STATS definition, collection, and report printing sequence.

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```
ADDPEXDFN  DFN(TEST) TYPE(*STATS)
           JOB(*ALL) DTAORG(*FLAT) MRGJOB(*YES)
           TEXT('PEX EXAMPLE all active jobs')

STRPEX SSNID(RBEXAM) DFN(TEST)



The same user-defined command
is run twice.  This command - CMDCSTPEX was run from
another job at the same time.

CMDCSTPEX CSTMBR(CSTFIL) ITMMBR(ITMFIL) LIBMBR(PFREXP)
CMDCSTPEX CSTMBR(CSTFIL) ITMMBR(ITMFIL) LIBMBR(PFREXP)


ENDPEX SSNID(RBEXAM) OPTION(*END)
       DTAOPT(*LIB) DTALIB(PEXAMPLE) DTAMBR(*SSNID) RPLDTA(*NO)
       TEXT('TEST FOR RB CMDCSTPEX 2 x from 2 jobs (*ALLJOBS)')


 PRTPEXRPT MBR(RBEXAM) LIB(COOL) TYPE(*STATS)
           STATSOPT(*CPU *PROGRAM) ORDER(*DESCENDING)
```

Figure 11. Running a PEX STATS Collection Example

Chapter 4, "PEX STATS Examples" on page 57 provides examples of PRTPEXRPT *STATS reports. Chapter 2, "Running the Performance Explorer" on page 21 provides a general overview discussion of collecting and using PEX data.

3.1 Performance Explorer Statistics (PEX STATS)

PEX STATS is a performance data collection facility in OS/400. You can view performance data at the system, library, job, and program level using the PEX collection and reporting commands. The data can be collected using OS/400 PEX Collection commands and printed with the AS/400 Performance Tools LPP Print PEX data command. If you are familiar with the AS/400 TPST PRPQ, you find that part of PEX STATS is quite similar to that package. However, there are also some dramatic functional differences between PEX STATS and TSPT.

3.1.1 What PEX STATS Does

Figure 12 on page 37 shows a sample prompt display for the Add Performance Explorer Definition (ADDPEXDFN) command. You can collect PEX data for all jobs in the system, a specific job in the system, jobs based on job name, or jobs based on user ID.

```
                        Add PEX Definition (ADDPEXDFN)

Type choices, press Enter.

Definition . . . . . > PEXSTJUL26    Name
Type . . . . . .   *STATS        *STATS, *TRACE, *PROFILE
Job name . . . . . .   *ALL          Name, generic*, *ALL, *
  User . . . . . .                  Name, generic*, *ALL
  Number . . . . . .                000001-999999, *ALL
               + for more values


                                                                  Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

*Figure 12. ADDPEXDFN *STATS Example*

There are a number of PEX STATS collection variations (options) available to you:

Job/System Level Collection (JOB keyword) Option

PEX STATS collects program level CPU and Disk I/O usage either system-wide or by individual job. When you create the PEX definition to be used for the collection, you define whether to collect data at the individual job level or the total system level.

Although you can collect PEX data for all jobs on the system with less CPU impact than the CISC version TPTS PRPQ, it is recommended to minimize the number of active jobs during a PEX *STATS collection, if possible.

Merge Job (MRGJOB keyword) Option

This option is available only with STATS DTAORG(*FLAT) collections.

Use this option to keep all the program data summarized for each active job (MRGJOB(*NO)), or to gather all the job and program data into a single consolidated report (MRGJOB(*YES)) that shows the CPU and disk I/O by program. It can be sorted a number of ways. If you specify MRGJOB(*NO), the resulting report is large because there are entries for every job on the system that used resources during the collection period. On the other hand, if you collect data for individual jobs, you probably want to see the report by individual job so you use MRGJOB(*NO).

If, for example, your collection is over several jobs and each of those jobs involves multiple programs performing random reads, then:

- MRGJOB(*YES) shows one total for the database random read program QDBGETKY for all jobs involved in the collection.
- MRGJOB(*NO) shows one total for program QDBGETKY for each of the jobs involved in the collection.

Flat/Hierarchical (DTAORG keyword) Collection Option

There are two ways to collect and view the program data. One is to consolidate (or roll up) all the individual job's program data into a single set of counters (for CPU and disk I/O data) per program. This is the DTAORG(*FLAT) option that, when printed, shows a single set of data values per program within the job. If you use the

MRGJOB(*YES) option, all the values for all jobs are rolled into one counter per program for all jobs.

The DTAORG(*HIER) option collects and reports the individual program statistics at the Call Level at which the program is invoked. For example, if A is the initial program in the job, it is running at Call Level 1. If A calls B, B is at Call Level 2. If B calls C and C calls A, the following call levels exist in the job:

PROGRAM	Call Level
A	1
B	2
C	3
A	4

Clearly, the previous example can occur only for programming languages that support recursion.

If you collect STATS data with the *HIER option at the individual job level, you get CPU and disk usage information for each program in the job by call level.

If, for example, your collection is over several jobs and each of those jobs involves multiple programs performing random database reads, then you see an entry for QDBGETKY for every program that performed random database reads (each entry appears at a call level number numerically higher than the program that called it).

The ability to collect at the individual job, program, and call level is extremely useful in application performance analysis, and represents a major step forward in the capability of the AS/400 Performance Tools. The user sees what programs are using the most resources (similar to the old TPST PRPQ), and with the STATS HIER option the logic paths are reconstructed in the reports so you know who called what and what programs used the most resources. This latter function is quite similar to the TPST PRPQ′s PRTTRCSUM option in that it shows you the logic flow of the job, with the added benefit of showing you what the resource consumption was.

Note: We strongly recommend selecting only 1 to 3 jobs when collecting *HIER data. If you select many jobs, your PRTPEXRPT report is large and the same program name may appear in many places throughout the report. This makes it hard to analyze. In addition, if you select too many jobs the PEX collection function seriously degrades total system performance.

The PEX STATS report′s Task Information section has a *run time* column that tells you the amount of CPU time the job used.

The Task Information section does not provide the total number of disk I/O operations for the job or task.

3.1.2 Using PEX STATS

If you know what jobs on the system you're interested in, you can collect data only on those jobs. If you do not know what to look for, start collection over all jobs and review the Task Information Section of the STATS report to find the jobs that are using the most resources.

In most cases, you use MRGJOB(*YES) and DTAORG(*FLAT).

3.1.2.1 PEX STATS or Performance Monitor?

Why not just use the Performance Monitor? STATS data shows you how long each job was active in addition to the CPU usage and disk I/O counts. You can run PEX over individual jobs, a group of jobs, or all jobs in the system for a short time or a much longer time. The monitor does not have that flexibility; it collects much more data (communications and device information), and does it every five minutes (unless you are using trace). PEX STATS is collecting information at the individual program level and rolling the data up into job and library level reports.

STATS data is quite accurate because the timing mechanism in the RISC systems provides microsecond (six decimal positions) resolution at the program level. At the job level, the reports tell you how long the job was active.

3.1.2.2 *Unknown Category

You can start and stop PEX STATS collection at any time. You receive resource usage data but, depending on what the programs in a job are doing, you may not see it accounted for accurately. The results may end up in the *Unknown category rather than in the program that you thought was using all the resources.

The shorter the time period you run a PEX collection, the greater the percentage allocated to *Unknown may be. This is because STATS collection is done at entry to and exit from a program. If the program is already entered when you start the STATS collection, there's no way to account for it to the program. Because the collection functions know that something is using the CPU, it gets counted and put into a counter called **Unknown*.

If you want to collect accurate information for an individual workstation job and functions, tell the operator to go back to the main menu. Then you start your collection and tell the operator to perform whatever it is you want to collect for. When the functions complete, have the operator go back to the main menu. At this time you can end the collection, save the data, and print it.

3.1.2.3 Looking at the Total System

When you first walk into a performance problem at an account, you may want to get some idea as to what jobs and programs are using the most CPU and doing the most disk I/O on the total system. We recommend running the OS/400 Performance Monitor first for approximately 30 minutes and printing and reviewing the System and the Component reports. Presuming the Performance Tools/400 licensed program is on the system, you should also run the WRKSYSACT command with display refreshes every 30 seconds for up to 15 minutes. You should be able to tell which jobs are consuming the higher percentages of CPU utilization and disk I/Os.

If performance problems appear to be primarily with interactive jobs, running the Performance Monitor with the TRACE(*ALL) option, and printing and reviewing the transaction reports may highlight specific jobs and some programs. These

Transaction reports are useful for interactive jobs, but not of much value for non-interactive jobs.

In this chapter we presume you have determined to use PEX STATS. In this case, run STATS DTAORG(*FLAT) option over all jobs with MRGJOB(*NO) for a reasonably short duration, such as 10 minutes. This is similar to the old TPST *ALL/*ALL for programs and libraries, except you do not have to wait forever for the system to set up (and later on take down) the collection environment. The RISC systems PEX support does things differently and much more efficiently.

Use some of the analysis tips and techniques discussed in the following sections to see what is happening on your system and to help formulate a performance analysis strategy. PEX STATS does a lot of the work for you, you just have to point it in the right direction.

3.1.3 PEX and Performance Tools/400

As we discussed in 1.1, “Introduction to Performance Explorer” on page 1, OS/400 provides the PEX collection and maintenance functions and command support, similar to OS/400 providing Performance Monitor collection and maintenance functions and commands. If you do not have the Performance Tools/400 Manager Feature on the system on which you collected PEX data, you may send it (usually as a single library) to a system with Performance Tools/400 for analysis.

In most cases, you analyze the Performance Tools/400 (Performance Monitor data collection) System and Component Reports first. This can lead to running the Performance Monitor again to collect TRACE(*ALL) data and then analyzing the various Transaction Reports.

In general, the transaction reports are good at identifying jobs and applications that need further investigation. The Transaction Summary Report contains a section that has the ″top 20″ highest CPU and disk I/O for *interactive transactions and jobs*. Object lock holder and waiter jobs are also included in the Transaction Summary Report. This may be sufficient to identify application program changes. However, as your environment contains more and more non-interactive applications (such as client/server applications) the need to use the Performance Explorer capabilities increases.

The AS/400 Performance Tools allow you to perform these functions:

- Performance measurement
- Performance analysis
- Capacity planning

These are achieved by collecting the following data from your AS/400 system:

- Throughput
- Response time
- Resource utilization

PEX data collection and reports provide a more detailed analysis of an application and object access, by program and job, than is available through the reports on the Performance Monitor collected data.

Why do I need PEX STATS?

PEX STATS gives you an extremely accurate account of which programs, processes, and tasks are using system CPU and disk I/O resources. Although the Performance Tools Print Transaction Report (PRTTNSRPT) gives you similar information in the Transaction and Transition Reports, the PEX STATS reports are more complete and accurate.

When can I use PEX STATS?

You use PEX STATS to determine which programs are being called the most, are using more CPU time, or doing more disk accesses than you think they should. PEX STATS does not show any inter-process dependencies, such as exceptional waits or object seize/lock waits.

The Transaction Summary Report *Longest Seize/Lock Conflict* section shows job holder and job waiter for a named object.

Use PEX STATS when problem analysis has identified inexplicable CPU or disk activity within a job or system task. PEX STATS FLAT MERGE(*NO) produces program statistics against individual jobs and tasks. However, because this option causes the system to keep extra internal counters, use of MERGE(*NO) results in considerably higher overhead than use of MERGE(*YES). Recall that both job trace and the Performance Tools Transaction report output can identify programs used within a job.

Where can I use PEX STATS?

PEX STATS is of considerable benefit in analyzing either a familiar or an unfamiliar environment. In a familiar environment you know what the application is doing but may not be aware of how the functions being done effect the system. PEX STATS allows you to analyze these effects. In an unfamiliar environment, use PEX STATS to identify those application or IBM supplied programs in an application that are called the most or are using the most CPU and disk resources. This allows you to decide where to spend time on improving the applications performance.

What exactly is PEX STATS?

PEX STATS is a performance analysis tool that provides a breakdown of central processing unit (CPU) usage and paging for:

- Programs (both user application and system programs) built in either the OPM or ILE structure.
- High-level MI instructions (referred to as Complex MI instructions). These are the machine instructions OS/400 is programmed to.
- MI processes (user and IBM-supplied jobs)

 Note: The term **MI process** is sometimes used instead of the word *job*, but the two terms mean the same. Consider the phrase *Process Access Group (PAG)*. This is the collection of variables (such as file open information) for a job (process) that is unique

by job and separate from the program code that is shared by multiple jobs (processes).

- Licensed Internal Code (LIC) tasks that are used by the system.

 Note: A LIC task does work below the MI interface. However, the *Task Information* section of a PRTPEXRPT includes both LIC tasks and OS/400 jobs because they represent all work being managed by the system. From a LIC task dispatching viewpoint, both LIC tasks and OS/400 jobs (MI processes) are considered tasks.

PEX STATS does not produce detail for LIC programs, or low-level MI instructions.

The PEX data collection and reporting can be for all system activity or individual job activity occurring during the data collection interval. PEX STATS is useful in determining CPU time for a specific application function and the proportion of the CPU time and disk accesses attributable to each program in the function.

PEX STATS collection is controlled by the OS/400 STRPEX and ENDPEX commands. PEX data collection can run concurrently with the OS/400 Performance Monitor and the Performance Investigator/400 PRPQ, 5799-FRD for V3R6 and V3R7. (The Performance Investigator/400 is a real-time performance monitor that can be used to detect if user-defined thresholds have been reached, then call a program or graphically display the resource utilization on a client workstation.)

While all of the performance monitors run independently of each other, performance impact must be monitored closely. For more on PEX STATUS performance impact considerations, refer to index entry *CPU impact caution*.

3.1.3.1 Performance Analysis Tools and Reports

Figure 13 shows the AS/400 Performance Tool reports, PEX STATS reports, and OS/400 commands that can be used in the performance analysis process.

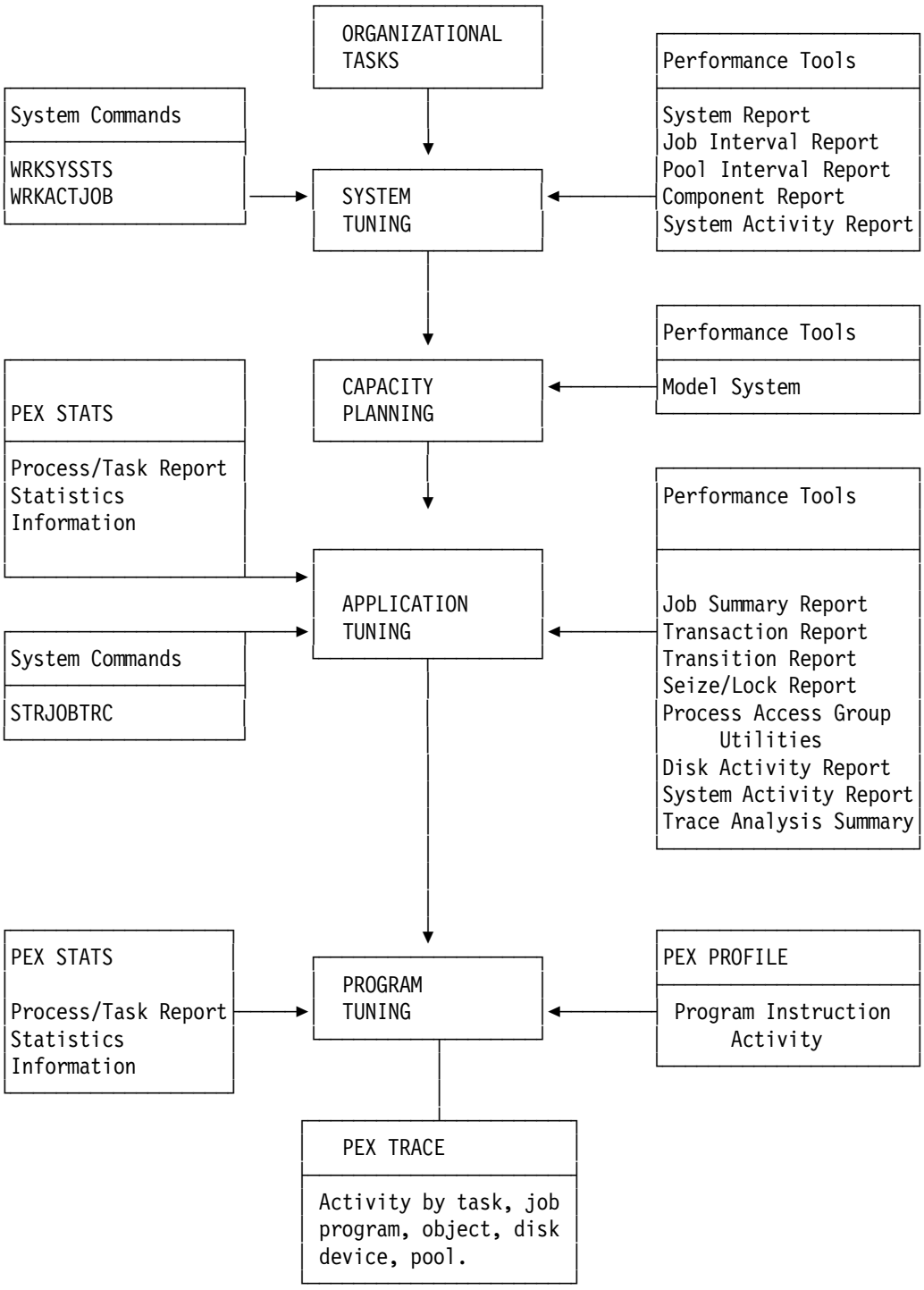


Figure 13. Performance Analysis Tools and Reports

3.2 Interpretation and Analysis of PEX Reports

The remainder of this chapter is designed to help you interpret the data recorded in the PEX STATS reports by explaining some of the entries you might see. Chapter 4, “PEX STATS Examples” on page 57 provides actual report examples.

Remember that PEX STATS shows the use of CPU time and disk read and write operations by tasks, processes, programs, OS/400 modules, and MI-Complex Instructions. The reports do not show how these resources are used, or whether they are used efficiently. PEX STATS also does not show wait times due to queuing problems, such as when a process goes from an active to wait state that may be ″normal″ in the case of an interactive transaction or ″potentially abnormal″ when waiting for a database record, data queue, message queue, or some other object lock to be released by another job or LIC task.

The differences between database (DB) and non-database (NDB) I/O (or read and write) operations should be discussed before examining the specific components of the reports. DB I/O operations generally represent productive work being done for your job, such as an update to a record in a file. NDB I/O is concerned primarily with system activities to manage tasks and sub-tasks, such as loading programs and other non-database objects.

There are many NDB objects that are an integral part of applications such as office documents, folders, data queues, user spaces, and user indexes.

The number of DB and NDB I/O operations that occur is typically influenced by the available main storage. In other words, if main storage is not a constraint, the number of reads and writes are usually lower than when memory is constrained, because more pages are held in main storage. Because of the change to a 4K page frame size, this assumption may not be totally true in a smaller main storage system with a high number of users. Also, the implementation of some functions always requires bringing into main storage some objects regardless of how much main storage is available.

Therefore, to understand how many of the I/O operations for a task are related to the task design itself, it is necessary to first measure the job stand-alone, and then in conjunction with other jobs sharing the same main storage pool. The latter case usually shows more I/O operations if some of the job′s memory is taken away to be used by other jobs.

3.2.1 Steps to Interpreting PEX STATS Reports

Perform the following steps to interpret PEX STATS reports:

1. Always ensure that the AS/400 system itself is well tuned. Refer to Section 1.5.2, “System Tuning Tasks” on page 10.
2. If you know what application you want to investigate, you can collect PEX STATS data on specific jobs that are part of that application.

 Otherwise, use a PEX STATS definition that specifies DTAORG(*FLAT) and selects all jobs the first time you run the data collection. While this doesn′t focus on one particular job, it does give you an idea of which jobs are using the most resources. In PEX, all IBM OS/400 supplied programs and LIC tasks are automatically collected so you see what their effect is. Refer to

Section 3.3, “What Does This Module Do?” on page 51 for more information on IBM programs.

Important

- Use PEX STATS DTAORG(*FLAT) MRGJOB(*YES) over all jobs for an overview.
- Avoid use of PEX STATS DTAORG(*FLAT) MRGJOB(*NO) over all jobs as this can adversely affect performance.
- Do not use run PEX STATS DTAORG(*HIER) over all jobs in the system.

3. If your collection specified STATS DTAORG(*FLAT) MRGJOB(*YES) then print two PEX reports, one sorted by CPU time and the other sorted by Cumulative CPU time. Otherwise, print one PEX report using the PRTPEXRPT command defaults.

 a. Check the Library Section of the PRTPEXDTA report to ensure that all the application libraries you wanted are included in the report.

 b. Review the Task Information section to see if the SLIC error log task (EL-ERRLOG) or SLIC MC error log task (MCxxxxx) has many I/O counts or consumes more than 2% to 3% of total CPU used. This can indicate considerable error reporting, which in turn requires investigating to determine why these errors are being reported.

 You can look at these logs by entering the PRTERRLOG command, and selecting the specific logs you want to look at. Alternatively, you may look at the Licensed Internal Code log and Product Activity Log through the Start Service Tools (STRSST) command.

 Note: Use system service tools only under direction from your service representative. The *Licensed Internal Code Diagnostic Aids* manual, LY44-4900, and *OS/400 Diagnostic Aids* manual, LY44-4907, provide assistance in using these tools.

 c. Review the STATS Statistics Information for both the CPU and Cumulative CPU sorted listings. The counts of primary interest are usually on the first page of either of these reports. From here, you can determine which programs are using the most resource and concentrate on them in subsequent PEX STATS runs. Focusing on programs with a count of less than 1% of CPU time is usually not worthwhile.

3.2.2 STATS Report Headings

The following describes some of the headings on the STATS report.

Definition Information

Shows information about the collection definition; this part of the report is common to all PEX reports (STATS, PROFILE, TRACE).

This heading appears only once in any type of PEX report.

Run Information

Provides general system and session information about the collection; common to all PEX reports.

This heading appears only once in any type of PEX report.

Stats Summary Information

Shows CPU use information; unique to PEX STATS.

Library Information

Shows collection information for each library; provides data on call and complex MI counts, and CPU and disk I/O (both inline and cumulative).

Task Information

Shows information about all tasks and jobs in the collection including pool, priority, existence, and run time; the last common report section.

Statistics Information Section

Shows collection information for each program; provides data on call and complex MI counts, and CPU and disk I/O (both inline and cumulative).

The *Call Level* heading is only used for hierarchical collections. It shows the **relative** call stack position of programs (reconstructed from collected PEX data) and not the actual call level numbers that were used at run time. Thus, if program ITSOR1 shows a call level of 4 and program QDBGETKY appears at call level 5, you know that program ITSOR1 called the program QDBGETKY.

3.2.3 Sequence of STATS Report Sections

For a collection made using PEX STATS DTAORG(*FLAT) MRGJOB(*YES), only one set of statistics for all jobs is printed. Each section in the PEX report appears once only, in the following sequence:

1. Definition Information
2. Run Information
3. Stats CPU Summary Information
4. Library Information
5. Task Information
6. Statistics Information

For a collection involving separate statistics for **each active job**, there are multiple occurrences of certain sections. Examples of such STATS collections include:

- PEX STATS DTAORG(*FLAT) MRGJOB(*NO)
- PEX STATS DTAORG(*HIER)

Assuming that n jobs **were active and used CPU** during the collection, there are (n+1) occurrences of some sections as follows:

- Definition Information
- Run Information
- (n+1) x Stats CPU Summary Information
- (n+1) x Library Information
- (n+1) x Task Information
- (n+1) x Statistics Information

The Stats CPU Summary Information section indicates the start of a new statistical grouping, known as a *Partition*. There is a single Partition covering all jobs and tasks in the collection, and one for each individual job that used CPU during the collection. Therefore, even when a PEX STATS DTAORG(*HIER) collection is made over a single job, there are two partitions in the report, one for the job and all tasks (Partition 0) and one for just the job (Partition 1).

The first Stats Summary Information Section shows Partition 0, which represents the total of **all** jobs in the collection.

All subsequent Stats Summary Information Sections show Partition n, where n relates to one job that used CPU during the collection. The job to which Partition n relates is shown in the Task Information section that appears two pages following in the report (Partition section on page n and associated job information on page n+2).

3.2.4 Task Information Section

When reviewing the Task Information Section, be aware that PEX STATS does not show any wait times due to a queuing problem, or job state transition effects such as active to wait, ineligible to wait, lock wait, and seize waits. These are reported in the job summary-level Transaction Report of the AS/400 Performance Tools.

See the description for Figure 10 on page 31 for additional PEX Task interpretation assistance. Refer also to Appendix C, “AS/400 LIC Tasks (Partial List)” on page 485 for a list of most of the LIC tasks that may have been active during the collection.

The following are the key elements to review in the Task Information Section.

3.2.4.1 CPU

Typically the CPU value is used to determine what processes/tasks were active during the data collection interval. Since PEX STATS can collect data either system-wide or by job, it helps you identify which tasks contributed to the data for modules/programs listed in the module section. Use this report to verify that you are indeed running stand-alone if that is what you are expecting.

If an unknown environment is being measured, concentrate on those tasks with the greatest CPU usage. You want to determine which programs were being run for these tasks. Once you identify the programs, you can refer to the module section for the resource usage for those programs. They are probably those with the highest CPU and Cumulative CPU times.

Use the following actions to determine which programs were running:

- Use a PEX Definition that specifies specific jobs.
- Use trace job commands to collect and print trace information about a user′s job.
- Talk to the programmer who understands the application.
- Ask the user, whose user ID is part of the full job name in the report, what he or she was doing.
- Enter the Start Copy Screen (STRCPYSCN) command against the user’s display station, before starting PEX STATS, to verify what the user is doing on the system. Keep in mind that the application libraries are not necessarily identified on the user’s menus and screens.
- Enter the WRKJOB command against the job that the user is running. One minor disadvantage of WRKJOB is that although the program stack is clearly displayed, it needs to be refreshed constantly to track what the user is doing. On the other hand, if your job (that is doing the refresh) is running at a high enough priority, you can get good information about what the job is doing by continuously refreshing the job′s program stack to see what the active program is (the bottom program name in the stack).

If the CPU for a LIC task is high, look at the *Name* field to determine what kind of task it is. It may be an I/O manager, such as a token ring line IOM. In this instance, a high usage may suggest a requirement for another token ring adapter.

The *AS/400 Licensed Internal Code Diagnostic Aids* manual, LY44-4900, contains brief descriptions of LIC tasks. Refer also to Appendix C, "AS/400 LIC Tasks (Partial List)" on page 485 for a list of LIC task names. If LIC tasks appear to be using much CPU or disk I/O resource, compared to application programs, consider contacting IBM service for further assistance to determine if what you observe is normal or if it may indicate a system software problem.

3.2.4.2 DB Sync Reads

Synchronous DB reads are caused by obvious actions, such as reading a database file. However, they can also be caused by less obvious actions, such as adding to (when reuse deleted records is in use) or updating a database file, or creating a logical file.

Note, that, based on the current operating environment, there may be times when the system has to issue a synchronous read immediately before writing the updated data.

3.2.4.3 NDB Sync Reads

One of the more common forms of synchronous NDB reads is page faults. A high number of page faults can indicate an over-committed main storage pool; that is, too high of an activity level for the size of the pool. Other actions that cause synchronous NDB read (not necessarily in an over-committed environment) are:

- File Open/Close
- Add/Remove physical file member
- Sorts
- Save/Restore
- Index build
- Access to user objects that are not database files, such as:
 - Programs
 - Data areas
 - Office documents
 - Data queues
 - User spaces
 - User indexes
- System functions designed to touch many objects, such as:
 - DSPOBJD lib/X*
 - DSPFD lib/*ALL
 - DSPUSRPRF profile *OBJOWN
 - WRKACTJOB (one of the most common offenders)
 - WRKOUTQ *ALL (also seen often)
 - WRKWTR
 - File Transfer, especially SNADS

3.2.4.4 DB and NDB Sync Writes

Synchronous DB writes are associated with adding to or updating a database file, or creating a logical file. Actions that might cause synchronous NDB writes include:

- Sorts
- Creation or deletion of objects (with such commands as CRTPF, ADDPFM, and DLTF)
- Updating a data area
- Closing of files

3.2.4.5 DB and NDB Async Reads

These are typically performed by LIC tasks reading ahead on behalf of an OS/400 job, so that the data that is processed by that job (or program code that is run in that job) is already in main storage when it is to be used. These represent access to the auxiliary storage, and are usually associated with DB or sorts. High numbers (relative to CPU milliseconds) need not be a concern, because these usually represent efficient use of the auxiliary storage.

There can be cause for concern if asynchronous reads are being performed on one or only a few disk arms. If there are a high number of these I/Os being performed, the disk arm utilization may be significantly higher than normal guidelines and the disk arm becomes a bottleneck. PEX STATS does not identify disk arm utilizations. To view disk utilization statistics, you need to collect Performance Monitor data and examine the System Report *Disk Utilization* section, repetitively view WRKDSKSTS command output, or use the Enhanced PEX TRACE support described later in this redbook.

3.2.4.6 DB and NDB Async Writes

These are the write counterparts of the asynchronous read functions. The information for asynchronous reads applies here as well.

Note: If there are lots of unexplained disk I/O operations, use the PEX TRACE options to collect and analyze the I/O activity.

3.2.5 Statistics Information

With the Statistics Information, focus primarily on the number of calls, the amount of CPU used, and the amount of Cumulative CPU.

3.2.5.1 CPU

For those programs with the highest amount of CPU time (multiple milliseconds), and a Cumulative CPU time approximately equal to the CPU time, you need to investigate what each program is doing. Using PEX PROFILE data collection (the old Sampled Address Monitor) is the best analysis option here.

It is important not to just weigh the CPU time alone. With the Statistics Information, compare the CPU time against the number of calls for each count. Those programs with the highest CPU times *per call* warrant further investigation.

For OS/400 modules and MI Complex Instructions with high CPU utilization, you want to investigate your application design with the intent of decreasing the frequency of calling these modules. For example, in an application doing a lot of non-blocked I/O, the module QDBGETSQ (get sequential) is called a lot, and as a result may use a significant amount of CPU. If the order of processing and the

file is such that database blocking can be used, you might see the module QDBGETM (get multiple) being called, which can result in less CPU utilization.

Refer to Section 3.3, “What Does This Module Do?” on page 51 and Section 3.3.2, “MI Complex Instructions” on page 54 for an explanation of some of the most commonly used modules and MI Complex Instructions. Be sure to read Chapter 4, “PEX STATS Examples” on page 57.

3.2.5.2 Cumulative CPU

If a program shows high Cumulative CPU usage and low CPU usage, you should collect a job trace with either the OS/400 TRCJOB command or the Performance Tools/400 interfaces to the TRCJOB function using the STRJOBTRC/ENDJOBTRC commands. You should review this trace job output along with a PEX collection of TYPE(*STATS) DTAORG(*HIER) and PRTPEXRPT output.

Comment on PEX STATS Hierarchical Support

Note that the CISC systems TPST PRPQ provides a Print Trace Summary (PRTTRCSUM) command that includes call/return and invocation level information to assist in understanding the flow of control between programs, and prioritizing programs within a job that should be further examined.

PEX does not provide the PRTTRCSUM function. In most cases the PEX STATS *HIER reports provide equivalent or better information using PRTPEXRPT.

The US National Technical Support Center has a set of additional performance tools known as IBMLIB. For V3R6 and V3R7 IBMLIB includes the PRTTRCSUM tool migrated from CISC systems. If you wish to explore using the IBMLIB set of tools contact the US National Technical Support Center in Rochester, Minnesota, USA. The tool is available only to IBM employees.

OS/400 modules with a high Cumulative CPU usage are possible. One example is deferred maintenance of an access path, where the first open uses a lot of CPU time.

MI Complex Instructions have identical CPU and Cumulative CPU usage, so ignore them at this time.

3.2.5.3 CALL OR XCTL

The count in this column is the number of calls or transfer controls (no return to calling program) to another program. This is useful to determine if high Cumulative CPU may be from programs called or from MI Complex Instructions.

3.2.5.4 Synchronous I/O

This is the total number of synchronous I/O operations issued by a program. Waiting for synchronous I/O to complete impacts performance. If this happens many times per second, performance can be noticeably degraded.

This heading includes the sum of all synchronous reads and writes, both DB and NDB. Remember that if the data is already in main storage, there is no synchronous I/O.

3.2.5.5 Asynchronous I/O

This is the total number of asynchronous I/O operations issued by a program. It is the sum of all asynchronous reads and writes, both DB and NDB.

3.3 What Does This Module Do?

OS/400 modules more easily relate to program function than do MI Complex Instructions. The purpose of the following list is to explain the activity of some of the most commonly used OS/400 modules.

Appendix B, “AS/400 Modules (Partial List)” on page 437 contains a more complete list of OS/400 modules, with one-line descriptions.

Module	Operation
QCA*	Command analyzer modules. These often represent CL commands used instead of HLL programs.
QCADRV	This module handles all CL commands and, in so doing, calls several other OS/400 modules. There is a one-to-one relationship between the number of calls of this module and the number of CL commands used in a CL program, run in an HLL program, and entered interactively. This module calls all QCA* modules.
QCAPOS	Called by the QCADRV module.
QCARULE	Called by the QCADRV module.
QC2IO	This is an ILE C program that interfaces between the user application program and OS/400 data management (for example, database and workstation I/O operations).
QDB*	Database module.
QDBGETKY	Accesses a file for input or update using a key for random access. An example is chaining in RPG.
QDBGETM	Sequential reads using blocking for input only. Refer to items and on page 54.
QDBGETSQ	Sequential reads, with each record retrieved individually. In this instance, an RPG program is not using blocking. Refer to item on page 54.
QDBPUT	Used to add or write non-blocked records to a database file. Refer to item on page 54.
QDBPUTM	Applies to the blocking in output files only. Refer to item on page 54.
QDBCLOSE	Full closes done against database files.
QDBOPEN	Full opens done against database files.
QDBSOPEN	Shared opens done against database files.
QDMCLOSE	The number of calls of this module is equal to the total number of all closes of all files except spooled files.
QDMCOPEN	The number of calls of this module is equal to the total number of file opens (excluding spooled files). This module is often called recursively for S36E opens (RPGII or System/36 COBOL programs).

QEX*	System/36 environment module.
QEXCIFL	Processes S36E // statements. Locks a file.
QEXCLSS	Does OCL substitution and procedure control expression evaluation. When high, see if OCL can be simplified or reduced. For example, replace //FILE in each step with one at the beginning of the procedure with JOB-YES specified if possible.
QLN*	This is an ILE COBOL module.
QLNRFSEQ	This is an ILE COBOL program that interfaces between the user application program and OS/400 data management (for example, database and workstation I/O operations).
QLRMAIN	Program initialization for OPM COBOL programs.
QMH*	Message handling modules, such as `record not found` or `added record already existing`.
QMHSNJMQ	Puts messages to the job log. When high, find out the cause and attempt to eliminate the problem. More than 1% of CPU time warrants further investigation.
QQQ*	Modules used for QUERY and SQL. Use of traditional HLL programs with DB I/O and logical files instead of these may improve system performance.
QQQIMPLE	Query initialization. Usually has high disk I/O and CPU use due to building a database index. Is called as a result of decisions made by QQQOPTIM.
QQQOPTIM	Query optimizer. Decides how to run a query, SQL, or OPNQRYF and whether or not to build an index. Changes in each release and may give totally different results between releases, or as a result of logical files being added or taken away from a physical file.
QRGXINIT	Program initialization for OPM RPG.
QRNXINIT	Program initialization for ILE RPG.
QRNXIO	This is an ILE RPG program that interfaces between the user application program and OS/400 data management (for example, database and workstation I/O operations).
QSF*	Subfile module.
QSFCRT	Each time this module is called, a subfile (part of a display file) is created.
QSFGET	Each time this module is called, a record out of a subfile is read from a program.
QSFPUT	Writing of subfile records to the subfile. This module is called every time you write a record to a subfile from your program.
QSNAPI	ILE C generalized screen I/O interface module.
QSP*	Spool modules.
QSPOPEN	Full opens done for spooled files. Spooled files have two opens; one against the device file and one against the spooled file member where the physical data actually resides. The count for this module always equals the number of spooled files opened. Refer to item on page 54.

QUI* — These are system **U**ser **I**nterface modules. These modules do most of the screen formatting for system commands and other functions.

QUIINMGR — User Interface Manager Interaction program that interfaces to work station data management on behalf of system functions. The Performance Tools - Transaction report charges the calling program with all the resources used by any programs called by it, but which do not interact with the workstation. This may result in an inaccurate representation of programs that are high resource users. An example of this is the QUIINMGR program/module.

This program can be charged as a long transaction if a program called from the command screen displayed by QUIINMGR performs excessive processing but never issues a Write to the screen. Upon return to QUIINMGR, QUINMGR writes to the screen and gets charged with the long transaction because it issues the first write to the screen following input from the workstation.

Examples that assign poor performance to QUIINMGR include:

- SNDNETF for a large save file; copies the save file to an internal space for a SNADS send job to distribute
- SNDNETSPLF for a large spooled file; copies the printed output to an internal space for a SNADS send job to distribute
- A long running query that produces printed output only
- A program that builds a large database file

QWP* — Work station printer support modules.

QWPPTFLD — This module is used in conjunction with print files. It does formatting of print output for SNA/SCS protocols, and can be a high user of CPU time or cumulative CPU time, especially if 3270 device emulation is being used.

QWPPUT — This module usually calls the QWPPTFLD module, and as such writes records to a print file.

QWS* — Work station display support modules.

QWSGET — Each call of this module represents the read of one display file format, or the second part of an RPG EXFMT. The number of calls of this module equals approximately the number of times the Enter key is pressed.

QWSOPEN — Full opens for work station display files.

QWSPUT — Sending of formats to the display screen. If Cumulative CPU for this module is high, you may see improved system performance by adding deferred writes. The call of this module represents the write of a format of a display file from a program to a display screen, or an RPG EXFMT.

QWSSFLCT — This module is called when the subfile control record is written.

QWVPDAGE — This module is called when an activation group destroy function is performed.

QZDA* — These are OS/400 Host server (database, file, etc.) modules.

3.3.1 Examples of OS/400 Module Relationships

Examples of relationships between OS/400 modules include the following:

- Database blocking factors, and random versus sequential accessing can be determined (especially for a dedicated batch run) by looking at the call counts for QDBGETSQ, QDBGETM, QDBPUT, and QDBPUTM.
- If you know how many records were read or written by a job, you can determine the HLL blocking factor by comparing the number of records to the number of calls of QDBGETM and QDBPUTM. These are called once per block. If you see QDBGETSQ or QDBPUT instead, then no HLL program blocking occurred. This indicates that SEQONLY(*YES number-of-records) on the Override Database File (OVRDBF) command either needs to be used, or it is used but for some reason the system is ignoring the function. Check the job for a diagnostic message.

 Similar logic can be applied to OS/400 and LIC blocking.
- The total number of full opens = QDBOPEN + QWSOPEN + QSPOPEN. Therefore, the ratio of full to shared opens is approximately:

 `(number of full opens) / ((QDMCOPEN + QSPOPEN) - number of full opens).`
- The ratio of full DB opens to shared opens is

 `QDBOPEN/QDBSOPEN.`

 This information, combined with the total CPU for opens and closes (CCPU % - Cumulative CPU Utilization percentage for QDMCOPEN and QDMCLOSE) and the knowledge that shared opens cost approximately 90% less than a full open, allows you to calculate how much leverage you have in doing more shared opens or eliminating opens and closes by leaving programs active or by using group jobs.
- To get an approximate calculation of the Cumulative CPU opens and closes for systems running the System/36 environment, use the following formula:

  ```
  (QDMCOPEN ccpu - QEXOPN ccpu) + ((QCIOPENF + QCIOPEND + QCIOPENP) * 2) +
     QDMCLOSE ccpu
  ```
- A large number for QSPOPEN without many spooled files actually being produced indicates programs opening print files and not writing anything to them (an example is a debug file). In other words, an open and close of a spooled file is being done for no reason. *Open a spooled file only when you need it.* If QSPOPEN appears frequently as a result of running an interactive application, consider having a portion of the application partitioned to run in batch.

3.3.2 MI Complex Instructions

The purpose of this list is to explain some of the MI Complex Instructions and how they relate to OS/400 modules. Unless you are familiar with MI Complex Instructions, which were known as MI-SVLs (supervisor calls) on CISC systems, it is easier to determine what a program is doing by referring to the OS/400 modules. For a more complete list of MI Complex Instructions, refer to Appendix A, “AS/400 MI Complex Instructions (Partial List)” on page 433.

MI COMPLEX INSTRUCTION - OPERATION

*ACTCR — Activate Cursor. This MI Complex Instruction is used for full DB opens (includes spooled files opens from both intercept time and the printer writer).

*CRTCR — Create Cursor. This is used for full DB opens.

*CRTDOBJ — Create duplicate object. This MI Complex Instruction is used when the system duplicates an existing object; for example, to create an open data path (ODP).

*CRTDS — The creation of any data space (DS) is the simplest form of a database object. It is used for PF members.

*CRTPG — Program creation. This MI Complex Instruction usually means a compile operation was done during the data collection.

*DEQWAIT — Dequeue, and wait if necessary, for a message. This is used to wait for:

- workstation I/Os
- most (except stream I/O operations) communications I/Os
- data queue dequeues

An *DEQWAIT is one point in which a Process Access Group (PAG) purge may occur. Therefore, CPU time may be high as a result of PAG purges/brings. This depends on whether PURGE(*YES) or PURGE(*NO) is in effect.

*DEQ — Dequeue a message, similar to *DEQWAIT except that *DEQ never waits. This means it does not have the corresponding PAG PURGE considerations.

*DESCR — Destroy Cursor. This is used for full DB closes.

*ENSOBJ — Ensure changes to object by immediate write to auxiliary storage. Data area updates are handled with these.

*INSDSEN — Insert data space entry, MI Complex Instruction for the random write (add) of a new record.

*INSSDSE — Insert sequential data space entry MI Complex Instruction for the QDBPUTM module.

*MATPTR — Materialize the pointer to an object already found and authorized to.

*UPDSEN — Update of all records. The relationship between this and *RETDSEN shows the percentage of read records actually updated.

*RETDSEN — MI Complex Instruction for the QDBGETSQ module - Unblocked DB reads.

*RETSDSE — MI Complex Instruction for the QDBGETM module - Blocked DB reads.

*RSLVSP — Resolve system pointer caused by full opens, commands, message handling, and late bound calls (calls using a variable).

*SETCR — Set Cursor Index positioning.

*WAITEVT — Work station I/O wait in System/36 environment.

3.4 Producing a Smaller STATS Report

Some PEX STATS reports produced using PRTPEXRPT may have a large number of pages. The size of the report depends on:

- The data organization (DTAORG) parameter of the PEX STATS collection definition

 DTAORG(*FLAT) produces significantly less pages than DTAORG(*HIER)

- Whether individual job or consolidated statistics are collected (MRGJOB parameter) of the PEX STATS collection definition

 This applies to DTAORG(*FLAT) collections only. Use of MRGJOB(*YES) ensures that consolidated statistics are kept for each program across all jobs in the collection; thus each program name appears once in the report. Using MRGJOB(*NO) ensures that individual program statistics are kept for each job in the collection; thus a program name appears separately within each individual job that used it.

We have provided an example query in Figure 19 on page 96 that reproduces the contents of just the Statistics Information Section of a PRTPEXRPT, excluding overall CPU percentages. Record selection criteria can be added to this query in order to **reduce** the size of the report.

Chapter 4. PEX STATS Examples

PEX STATS is useful for determining the CPU consumption and disk I/O activity for programs/modules active during the PEX STATS collection. This chapter shows examples of how to use the STATS reports from the PRTPEXRPT command.

PEX STATS is primarily a program-oriented performance tool, not a job-oriented tool. However, with STATS DTAORG(*HIER) you can link specific program usage to a specific job through some manual effort.

PEX STATS is able to capture precise data on each program's resource usage by interrogating resource counters at each program-to-program transition. The ADDPEXDFN command establishes an operating environment for the PEX STATS monitor. Unlike TPST (CISC system Timing and Paging Statistics PRPQ), PEX STATS monitors data for all programs that are eligible for collection; there is no easy way to restrict collection to a subset of programs only. This is because PEX STATS uses an OPM program attribute and the ILE module attribute called Enable Performance Collection, which determines the level of data to be collected for a program.

Also unlike TPST, PEX STATS can collect data for all jobs or only specific jobs. We do this by specifying all jobs, specific job names, generic job names, or * (this job) on the ADDPEXDFN TYPE(*STATS) JOB parameter. By selecting this definition on the STRPEX command DFN parameter we determine what set of PEX collection functions to use.

Try to end PEX STATS collection as soon as possible because it may add significant CPU utilization on a busy system if the ENBPFRCOL attribute is set to other than Program Entry Procedure (PEP). ENBPFRCOL(*PEP), the only value for OPM programs, uses the least possible PEX STATS collection overhead. PEP is the default in V3R7 and, if PTF MF11968 has been installed, the V3R6 default.

See index entry *ENBPFRCOL* for more details.

Although PEX STATS is more powerful than previous TPST performance collection capabilities, there are two nice functions available with TPST for which there is no obvious equivalent function in RISC performance tools. These functions are:

- Print Trace Summary

 The TPST Print Trace Summary (PRTTRCSUM) command provides an interpretation of an OS/400 job trace placed into a database file. PRTTRCSUM output can show the call and return stack so you can view the interrelationships between user programs and OS/400 programs/modules in call sequence.

 PEX *STATS DTAOPT(*HIER) provides equivalent information, though the associated PRTPEXRPT does not indent the program names, based on call level number as TPST PRTTRCSUM does.

 Note: On RISC systems PRTRCSUM is available only in the IBM Services Library, IBMLIB. You should contact your IBM Technical Support group for details on how to obtain this library. However, please be aware that it is only available as part of an IBM Service offering. This is because it is an

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unsupported IBM tool, and only IBM Services professionals have been trained in how to interpret the reports.

You could write your own program to do the Call level indentation of PEX *HIER collected data.

We have run both the formally supported PRTTRCSUM on CISC systems and the RISC system IBMLIB PRTTRCSUM and they both produce equivalent output. When run against ILE programs, the first several pages contain ″unexpected program return″ messages, but the indented call and call level number section of the reports appear accurate. PEX *STATS DTAORG(*HIER), though not formatted as nicely as PRTTRCSUM, has no error messages for ILE programs.

- Compare TPST Tool

 CISC system TPST provides the Compare TPST (data) command CMPTPST. This command enables the comparison of up to 9 sets of collected TPST data.

 For RISC system PEX collected data you have to manually do the comparisons or write your own program to do this.

PEX STATS HIER provides similar capability to PRTTRCSUM as it can be used to determine the frequency of calls to user programs, HLL initialization routines, and file open and close routines. An advantage over TPST is that the PEX STATS HIER report shows the call stack level of each program or procedure.

Use PEX STATS FLAT when problem analysis has identified inexplicable CPU or disk activity within a job or system task. PEX STATS FLAT MERGE(*NO) produces program statistics against individual jobs and tasks. However, because this option causes the system to keep extra internal counters, use of MERGE(*NO) requires considerably higher overhead than use of MERGE(*YES). On busy systems, PRTPEXRPT of STATS MERGE(*NO) data may produce hundreds of pages in the report. See Section 4.6, “PEX STATS Query Example” on page 95 for more information. Recall that both job trace and the Performance Tools Transaction report output can identify programs used within a job.

To show how PEX STATS can help you in your environment we wrote sets of programs and analyzed them with PEX STATS. The following topics present a series of examples showing various PEX STATS collection options and associated PRTPEXRPT reports.

4.1 PEX STATS FLAT Example - Merge Jobs *YES

In this example, we show you both the PEX STATS HIER and PEX STATS FLAT reports so that you can compare them.

The program named OPENBAD calls the program OPEN5 100 times, which in turn opens five different files, producing 500 full opens. OPENGOOD overrides the files with SHARE(*YES) and pre-opens them using OPNDBF ...OPNOPT(*ALL), and calls OPEN5 100 times, producing five full opens and 500 shared opens. We analyzed both applications in an almost dedicated environment with PEX STATS. For PEX STATS FLAT we printed the reports sorted by cumulative CPU time; that is, the CPU time used by the program and all the programs invoked by the program directly or indirectly. Note that you cannot use a sort sequence against

PEX STATS HIER data; the sequence shown is chronological program call sequence, including invocation number.

First, we see the PEX STATS FLAT for the OPENBAD series of programs. Data was collected for one job only. All programs are enabled for PEX collection at the PEP level only. Please refer to Section 1.6, “Requirements for Collecting PEX Data” on page 14 for details on enabling programs for PEX STATS (and TRACE) performance data collection.

The following PEX STATS FLAT example was printed with programs in *descending cumulative CPU* sequence.

```
                                                Performance Explorer Report                              8/12/96 16:16:43
                                                  Definition Information                                        Page
                                                                                                                   1
Library . . : QPEXDATA
Member. . . : F_OPENBAD
Description : OPENBAD PEX STATS FLAT EXAMPLE
Type . . . . . . . . . . . . : STATISTICS
Definition Name. . . . . . . : S_1J_F
Defined By . . . . . . . . . : A960123A
Definition Description . . . : Stats FLAT for 1 Job Only, Merge jobs *yes
Data Organization. . . . . . : FLAT
Overhead Subtraction . . . . : YES
Merge Jobs . . . . . . . . . : YES
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *   C
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
                                                Performance Explorer Report                              8/12/96 16:16:43
                                                       Run Information                                        Page
                                                                                                                   2
Library . . : QPEXDATA
Member. . . : F_OPENBAD
Description : OPENBAD PEX STATS FLAT EXAMPLE
Sessions since IPL. . . . . . . . . . . . . :                        230
Session name. . . . . . . . . . . . . . . . : F_OPENBAD
Start time. . . . . . . . . . . . . . . . . : 1996-08-12-16.15.58.603928
Stop time . . . . . . . . . . . . . . . . . : 1996-08-12-16.16.18.253488
Total time  DD-HH.MM.ss.uuuuuu. . . . . . . :         00-00.00.19.649560
Suspend time (us) . . . . . . . . . . . . . :                    174,264
Number of events. . . . . . . . . . . . . . :                     26,154
Trace wrap count. . . . . . . . . . . . . . :                          0
Job creating session. . . . . . . . . . . . : P23XWY32E A960123A  054089
Started by user . . . . . . . . . . . . . . : A960123A
Target system . . . . . . . . . . . . . . . : ITSOM05
Serial number . . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . . :                     98,304
OS/400 level. . . . . . . . . . . . . . . . : 5ON
Version . . . . . . . . . . . . . . . . . . : V3R6M0
Configured ASPs . . . . . . . . . . . . . . :                          1
Logical DASDs . . . . . . . . . . . . . . . :                          7
Data areas. . . . . . . . . . . . . . . . . :                          1
Jobs/tasks in session . . . . . . . . . . . :                        179
Jobs in session . . . . . . . . . . . . . . :                          1
                                                Performance Explorer Report                              8/12/96 16:16:43
                                               Stats CPU Summary Information                                   Page
                                                                                                                   3
Library . . . . . :  QPEXDATA
Member. . . . . . :  F_OPENBAD
Description . . . :  OPENBAD PEX STATS FLAT EXAMPLE
Partition . . . . :          1
Total Raw CPU . . :      3410896  A
Overhead Removed. :       588690
Total CPU . . . . :      2822206  B
Task CPU. . . . . :        85744     3.0 %
Job CPU . . . . . :      2736462    97.0 %
                  ----------------------
   Pgm/Mod CPU. . :      2742950    97.2 %
   Unknown CPU. . :            0     0.0 %
                                                Performance Explorer Report                              8/12/96 16:16:43
                                                  Statistics Information                                  Page    3
                                                     Library Section
Library . . : QPEXDATA
Member. . . : F_OPENBAD
Description : OPENBAD PEX STATS FLAT EXAMPLE
                                +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX              CPU        DB    DB   NDB   NDB              CPU        DB    DB   NDB   NDB  Call
Name        Called    Made  Issued          (us) /   %    SIO   AIO   SIO   AIO          (us) /   %    SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
HATT           101    1703     200        165,400  5.9      0     0     0     0      5,220,533 ****      0     0  1108     0     0
QSYS          2807    1193    9766        352,377 12.5      0     0     0     0      3,565,406 ****      0     0  1084     0     0
MI CPLX       9977       0       0      2,225,173 78.8      0     0   555     0      2,225,173 78.8      0     0   555     0     0
**LIC Task       0       0       0         85,743  3.0      0     0     0     0         85,743  3.0      0     0     0     0     0
**Unknown        0       0       0              0  0.0      0     0     0     0              0  0.0      0     0     0     0     0
```

*Figure 14 (Part 1 of 2). STATS FLAT - Full Opens SHARE(*NO) Example*

```
Library . . : QPEXDATA
Member. . . : F_OPENBAD
Description : OPENBAD PEX STATS FLAT EXAMPLE
```

Task ID	Job/Task Name	Pool	Priority	Existence Start/End		Elapsed Time (us)	Run Time (us)	Run Time Percent
(Jobs/tasks not using CPU have been removed)								
44270	P23XWY32E A960123A 054089	4	160	Y	Y	17868688	3325152	97.49 7
40644	PA-T-P23XWY32E	1	40	Y	Y	17868688	3328	0.10
273	IPRO050103--2619	1	10	Y	Y	17846696	6712	0.20
146	SMXCSPRVSR	1	79	Y	Y	17841624	1464	0.04
85	RMTMSAFETASK	1	0	Y	Y	17834200	424	0.01
82	XMSPDBUS01000000	1	10	Y	Y	17834200	48	0.00
1	CFINT1	0	0	Y	Y	17868696	73768	2.16


```
Library . . : QPEXDATA
Member. . . : F_OPENBAD
Description : OPENBAD PEX STATS FLAT EXAMPLE
```

				Inline Stats						Cumulative Stats						
Name	Times Called	Calls Made	MI CPLX Issued	CPU (us)	/ %	DB SIO	DB AIO	NDB SIO	NDB AIO	CPU (us)	/ %	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
	1										8					
OPENBAD	1	203	0	81,215	2.9	0	0	0	0	2,681,872	95.0	0	0	554	0	0
2																
OPEN5	100	1500	200	84,185	3.0	0	0	0	0	2,538,660	90.0	0	0	554	0	0
3																
QDMCOPEN	501	501	3510	131,249	4.7	0	0	0	0	1,565,752	55.5	0	0	554	0	0
4																
QDBOPEN	500	0	1500	67,388	2.4	0	0	0	0	815,255	28.9	0	0	526	0	0
5				9				6								
*CRTS	503	0	0	617,866	21.9	0	0	526	0	617,866	21.9	0	0	526	0	0
QDMCLOSE	501	501	3005	58,318	2.1	0	0	0	0	494,346	17.5	0	0	0	0	0
QDBGETM	500	0	1000	34,534	1.2	0	0	0	0	396,228	14.0	0	0	0	0	0
*RETSDSE	500	0	0	350,248	12.4	0	0	0	0	350,248	12.4	0	0	0	0	0
*CRTDOBJ	501	0	0	325,582	11.5	0	0	28	0	325,582	11.5	0	0	28	0	0
*RSLVSP	1119	0	0	242,857	8.6	0	0	0	0	242,857	8.6	0	0	0	0	0
*DESCR	500	0	0	202,609	7.2	0	0	0	0	202,609	7.2	0	0	0	0	0
*DESS	504	0	0	185,406	6.6	0	0	0	0	185,406	6.6	0	0	0	0	0
5																
*ACTCR	500	0	0	112,054	4.0	0	0	0	0	112,054	4.0	0	0	0	0	0
**LIC Task	0	0	0	85,743	3.0	0	0	0	0	85,743	3.0	0	0	0	0	0
QCLCLCPR	100	0	500	11,536	0.4	0	0	0	0	61,190	2.2	0	0	0	0	0
*MATPTR	2157	0	0	50,876	1.8	0	0	0	0	50,876	1.8	0	0	0	0	0
QPTPARML	1	6	1	262	0.0	0	0	0	0	44,906	1.6	0	0	1	0	0
QPTPRCSS	1	56	0	3,566	0.1	0	0	0	0	36,096	1.3	0	0	1	0	0
*LOCK	504	0	0	35,675	1.3	0	0	0	0	35,675	1.3	0	0	0	0	0
*SETACST	502	0	0	25,552	0.9	0	0	1	0	25,552	0.9	0	0	1	0	0
QMHRCVPM	5	2	36	1,013	0.0	0	0	0	0	17,031	0.6	0	0	0	0	0
*UNLOCK	503	0	0	16,948	0.6	0	0	0	0	16,948	0.6	0	0	0	0	0
*MATINVIF	645	0	0	15,542	0.6	0	0	0	0	15,542	0.6	0	0	0	0	0
QMHGSD	2	22	15	1,426	0.1	0	0	0	0	14,644	0.5	0	0	0	0	0
QWSGET	12	5	12	2,422	0.1	0	0	0	0	13,964	0.5	0	0	0	0	0
QT3REQIO	9	0	18	538	0.0	0	0	0	0	11,600	0.4	0	0	0	0	0
QUIMGFLW	2	14	0	819	0.0	0	0	0	0	10,651	0.4	0	0	0	0	0
*DEQWAIT	6	0	0	9,809	0.3	0	0	0	0	9,809	0.3	0	0	0	0	0
*MATSOBJ	101	0	0	8,710	0.3	0	0	0	0	8,710	0.3	0	0	0	0	0
QDBCLOSE	500	0	0	8,220	0.3	0	0	0	0	8,220	0.3	0	0	0	0	0
QUIEXFMT	2	6	0	626	0.0	0	0	0	0	8,136	0.3	0	0	0	0	0
*MATPRATR	508	0	0	7,871	0.3	0	0	0	0	7,871	0.3	0	0	0	0	0
QPTGTINP	3	9	6	4,814	0.2	0	0	0	0	7,710	0.3	0	0	0	0	0
QWSPUT	23	6	25	4,528	0.2	0	0	0	0	6,993	0.2	0	0	0	0	0
QSFPUT	15	1	0	4,036	0.1	0	0	0	0	6,181	0.2	0	0	1	0	0
QUIINMGR	2	4	0	1,237	0.0	0	0	0	0	5,916	0.2	0	0	0	0	0
QCADRV2	7	23	2	1,043	0.0	0	0	0	0	4,499	0.2	0	0	0	0	0
QCMDEXC	2	8	12	574	0.0	0	0	0	0	4,161	0.1	0	0	0	0	0
*MODSOBJ	506	0	0	3,516	0.1	0	0	0	0	3,516	0.1	0	0	0	0	0
*LOCKSL	100	0	0	3,129	0.1	0	0	0	0	3,129	0.1	0	0	0	0	0

*Figure 14 (Part 2 of 2). STATS FLAT - Full Opens SHARE(*NO) Example*

Notes for STATS FLAT OPENBAD Example:

A The definition used to collect this data specified only one job (as indicated by the ***** character under *Selected Jobs*). Thus, this figure

represents the CPU used by the one job and all tasks on the system, including any PEX collection overhead.

Note that work done by LIC tasks on behalf of our job is hp2.not apportioned to our job. That is, if TASKA spent 5% of the CPU it used on our job and 95% on some other job, this report includes all 100% of the CPU used by TASKA (and not just the 5% it really used for our job).

B Note that this figure is used as the base total CPU figure for the percentage calculations in the Statistics Information section. This is because the CPU overhead of PEX data collection can be removed at the program level, thus this figure is more accurate when reviewing individual program percentage statistics.

Be Careful on PEX CPU Utilization Removal

Since this example was created it has been determined that there are IBM software problems with the removal of CPU overhead charged to the PEX STATS performance data collection itself. As a result, V3R6 PTF SF37834 and V3R7 PTF SF38029 were created during January, 1997. These PTFs omit the removal of PEX data collection CPU overhead. See Appendix D, “Performance Explorer PTF Summary” on page 489 for additional details. The PEX STATS HIER example shown in Section 4.5, “PEX STATS HIER Example - Program at Multiple Levels” on page 83 shows report output with PTF SF37834 applied. You can tell the PTF has been applied by observing that fields *Overhead Removed* and *Total Raw CPU* do not appear on the report.

C This collection was over one job only. The PEX definition that we used specified that data is collected for the one job in which the STRPEX command is issued.

Since this STATS example used DTAORG(*FLAT), we do not get any values under the *Call Level* heading on the report. Remember this report was printed in descending **cumulative CPU** sequence.

Note also, that under the *Task Information* section of the report we have omitted all the LIC tasks that used no CPU.

1 We called program OPENBAD once. Cumulatively, this program used 95% of the CPU used during the PEX measurement. However, its direct CPU was only 2.9%, indicating that one or more programs it called (203 calls made) were responsible for most of the CPU used.

2 Program OPEN5 was called 100 times. We cannot see which program called it from this report (however we know that it was called from program OPENBAD). Cumulatively, this program used 90% of the CPU used during the PEX measurement; however, it directly used 3%. This indicates that most of the CPU is being used by a program running at a lower call stack level than program OPEN5.

3 QDMCOPEN is the Data Management Common Open system module. It is always called as a first step in opening a file. Note that it was called 501 times and had a cumulative CPU figure of 55% and a direct CPU figure of 4.7%.

4 This is the database full file open module (QDBOPEN). It was called 500 times, issued 1500 MI complex instructions, used 28.9% of the cumulative CPU and 2.4% of the direct CPU. Perhaps the difference between the direct and cumulative CPU is accounted for in the MI complex instructions called - but we cannot see what they are from this report (we need STATS HIER for this).

5 Names beginning with ***** indicate MI complex instructions. *CRTS through *ACTCR are taking significant direct CPU. *RETSDSE might be normal as part of database *sequential only* processing, depending on how many records are retrieved for *RETSDSE. But hundreds of calls for *CRTS, *CRTDOBJ, *RSLVSP, *DESCR, *DESS, and *ACTCR indicate a high possibility of hundreds of file opens and closes going on. These MI complex instructions are using a lot of direct CPU. Note that the direct and cumulative CPU figure is identical for MI complex instructions as they do not call anything else.

Note that *CRTS - creating a space, is used by OS/400 for many functions, including full file opens, work station subfiles, SNADS send functions, and so on. **6** Note the number of synchronous non-database I/Os is 526, slightly more than one per call to *CRTS!

*RETSDSE (Retrieve Sequential Data Space Entries) is typically associated with sequential database reads such as those indicated by the OS/400 QDBGETM (database get multiple records) module.

*CRTDOBJ (Create Duplicate Object) is performed for many different OS/400 functions, but is certainly part of full file open, which creates an Open Data Path (ODP) by duplicating an ODP prototype that is part of the file object itself.

*RSLVSP (Retrieve System Pointer) is performed for many OS/400 functions as part of finding an object that could be a file object being opened or a program object being called the first time within a job.

*DESCR (Destroy Cursor) is part of full file close.

*DESS (Destroy Space) could be part of full file close.

*ACTCR (Activate (database) Cursor) is typical of full file open.

7 This job used 97.49% of the CPU used by all jobs and all tasks involved in the collection. Specifically, this is 97.49% of the total raw CPU as shown in **A**. When reviewing the percentage CPU used by individual jobs, the reported percentage is based on the Total Raw CPU for the collection; PEX collection overhead is not removed for job level statistics shown in the Task Information Section, it is only removed for program or procedure level statistics reported in the Statistics Information Section.

In this example, we collected data for one job and all tasks. Thus, the CPU represents 97.49% of all the CPU used by **this one job** and all the tasks on the system - it does not represent 97.49% of overall CPU utilization at the time of the trace. Overall system CPU utilization is not reported by PEX, only CPU used by all jobs being traced and all system tasks is reported.

8 Ninety-five percent of the CPU used by all jobs and tasks traced was used by this program and all programs/procedures called from this program. Specifically, this program cumulatively used 95% of the total CPU shown in **B** in the Stats CPU Summary Information Section. Since the PEX collection overhead is known at the program/procedure level, program/procedure CPU percentages are based against this adjusted total CPU total to ensure the maximum level of accuracy.

9 To determine which system routines are the most costly, we divide the direct CPU by the number of times called to evaluate the cost-per-invocation. Thus we can compare different routines and find the most expensive. In this example the Create Space *CRTS MI complex instruction uses 617866/503 = 1228 CPU microseconds each time it is invoked. We need to reduce the number of invocations to this routine whenever possible, as it is both expensive and called frequently.

CONCLUSION

This report enables us to see which programs are using excessive CPU. Unless we are already familiar with most of the system routines (who calls what and why) we cannot get a good understanding of how the system routines interrelate using this report.

4.2 PEX STATS HIER Example - Bad File Opens

The next example shows PEX STATS run over the same programs performing identical functions to those in Figure 14 on page 60. However, this example was produced using STATS HIER over a single job, so that we can see the program flow via the *Call Level* column in the Statistics Information section of the report.

```
                                                Performance Explorer Report                              8/12/96 16:14:21
                                                  Definition Information                                       Page
                                                                                                                1

Library . . : QPEXDATA
Member. . . : H_OPENBAD
Description : OPENBAD PEX HIER EXAMPLE
Type . . . . . . . . . . . . : STATISTICS
Definition Name. . . . . . . : S_1J_H
Defined By . . . . . . . . . : A960123A
Definition Description . . . : Stats HIER for 1 Job Only
Data Organization. . . . . . : HIER
Overhead Subtraction . . . . : YES
Merge Jobs . . . . . . . . . : NO
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
                                                Performance Explorer Report                              8/12/96 16:14:21
                                                     Run Information                                         Page
                                                                                                                2

Library . . : QPEXDATA
Member. . . : H_OPENBAD
Description : OPENBAD PEX HIER EXAMPLE
Sessions since IPL. . . . . . . . . . . . . :                         228
Session name. . . . . . . . . . . . . . . . : H_OPENBAD
Start time. . . . . . . . . . . . . . . . . : 1996-08-12-16.13.34.333032
Stop time . . . . . . . . . . . . . . . . . : 1996-08-12-16.14.02.070552
Total time  DD-HH.MM.ss.uuuuuu. . . . . . . :         00-00.00.27.737520
Suspend time (us) . . . . . . . . . . . . . :                    293,176
Number of events. . . . . . . . . . . . . . :                     26,140
Trace wrap count. . . . . . . . . . . . . . :                          0
Job creating session. . . . . . . . . . . . : P23XWY32E A960123A  054089
Started by user . . . . . . . . . . . . . . : A960123A
Target system . . . . . . . . . . . . . . . : ITSOMO5
Serial number . . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . . :                     98,304
OS/400 level. . . . . . . . . . . . . . . . : 50N
Version . . . . . . . . . . . . . . . . . . : V3R6MO
Configured ASPs . . . . . . . . . . . . . . :                          1
Logical DASDs . . . . . . . . . . . . . . . :                          7
Data areas. . . . . . . . . . . . . . . . . :                        179
Jobs/tasks in session . . . . . . . . . . . :                        179
Jobs in session . . . . . . . . . . . . . . :                          1
                                                Performance Explorer Report                              8/12/96 16:14:21
                                               Stats CPU Summary Information                                 Page
                                                                                                                3

Library . . . . . :  QPEXDATA
Member. . . . . . :  H_OPENBAD
Description . . . :  OPENBAD PEX HIER EXAMPLE
Partition . . . . :          0  C
Total Raw CPU . . :      3435504
Overhead Removed. :       591665
Total CPU . . . . :      2843839
Task CPU. . . . . :       110904     3.9 %
Job CPU . . . . . :      2732935    96.1 %
                  ----------------------
   Pgm/Mod CPU. . :      2738119    96.3 %
   Unknown CPU. . :            0     0.0 %
```

*Figure 15 (Part 1 of 4). STATS HIER - Full Opens SHARE(*NO) Example*

```
                                        Performance Explorer Report                          8/12/96 16:14:21
                                             Task Information                                      Page
                                                                                                     4
Library . . : QPEXDATA
Member. . . : H_OPENBAD
Description : OPENBAD PEX HIER EXAMPLE
Task ID    Job/Task Name                Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                      Start/End                                          Percent
-------------------------------------------------------------------------------------------------------------------
                                                                                                          10
 E  44270 P23XWY32E  A960123A   054089     4      160   Y    Y            25979408              3324600     96.77
  (lines removed for jobs/tasks with 0 CPU)
    40644 PA-T-P23XWY32E                  1       40   Y    Y            25979416                 3344      0.10
      273 IPR00501O3--2619                1       10   Y    Y            25963280                 8872      0.26
      147 SMSTRIPEWATCHDOG                1       10   Y    Y            25942792                  768      0.02
      146 SMXCSPRVSR                      1       79   Y    Y            25942792                  416      0.01
       85 RMTMSAFETASK                    1        0   Y    Y            25933672                  808      0.02
       82 XMSPDBUS01000000                1       10   Y    Y            25933672                   48      0.00
       76 SMSIGNALEVENT                   1       10   Y    Y            25930512                11752      0.34

                                                                                                     8
Library . . . . . :  QPEXDATA
Member. . . . . :  H_OPENBAD
Description . . . :  OPENBAD PEX HIER EXAMPLE
Partition . . . . :          1   D
Total Raw CPU . . :       3409496  A
Overhead Removed. :        591665
Total CPU . . . . :       2817831  B
Task CPU. . . . . :         84896     3.0 %
Job CPU . . . . . :       2732935    97.0 %
                  ------------------------
   Pgm/Mod CPU. . :       2738119    97.2 %
   Unknown CPU. . :             0     0.0 %
                                        Performance Explorer Report                          8/12/96 16:14:21
                                          Statistics Information                                  Page    8
                                        M05

                                             Library Section
Library . . : QPEXDATA
Member. . . : H_OPENBAD
Description : OPENBAD PEX HIER EXAMPLE
                              +---------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX             CPU        DB    DB   NDB   NDB             CPU        DB    DB   NDB   NDB  Call
Name        Called    Made  Issued          (us) /   %    SIO   AIO   SIO   AIO          (us) /   %    SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
**LIC Task       0       0       0         84,895  3.0      0     0     0     0         84,895  3.0      0     0     0     0     0
**Unknown        0       0       0              0  0.0      0     0     0     0              0  0.0      0     0     0     0     0
QSYS          2805    1191    9761        346,328 12.3      0     0     0     0      3,569,675 ****      0     0  1094     0     0
MI CPLX       9972       0       0      2,227,615 79.1      0     0   561     0      2,227,615 79.1      0     0   561     0     0
HATT           101    1703     200        164,175  5.8      0     0     0     0      5,210,276 ****      0     0  1120     0     0
*Alias           0       0       0              0  0.0      0     0     0     0              0  0.0      0     0     0     0     0
                                        Performance Explorer Report                          8/12/96 16:14:21
                                             Task Information                                      Page
                                                                                                    10
Library . . : QPEXDATA
Member. . . : H_OPENBAD
Description : OPENBAD PEX HIER EXAMPLE
Task ID    Job/Task Name                Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                      Start/End                                          Percent
-------------------------------------------------------------------------------------------------------------------
     44270 P23XWY32E  A960123A   054089     4      160   Y    Y            25979408              3324600     97.51
         1 CFINT1                         0        0   Y    Y            25979408                84896      2.49  F
-------------------------------------------------------------------------------------------------------------------
                                                                                                3409496
```

*Figure 15 (Part 2 of 4). STATS HIER - Full Opens SHARE(*NO) Example*

Library . . : QPEXDATA
Member. . . : H_OPENBAD
Description : OPENBAD PEX HIER EXAMPLE

Name	Times Called	Calls Made	MI CPLX Issued	Inline Stats CPU (us)	CPU %	DB SIO	DB AIO	NDB SIO	NDB AIO	Cumulative Stats CPU (us)	CPU %	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
**LIC Task	0	0	0	84,895	3.0	0	0	0	0	84,895	3.0	0	0	0	0	0
**Unknown	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	0	0	0
(Lines removed for brevity.)																
QCACALL	1	0	2	82	0.0	0	0	0	0	499	0.0	0	0	0	0	1
*RSLVSP	1	0	0	320	0.0	0	0	0	0	320	0.0	0	0	0	0	2
*MATSOBJ	1	0	0	96	0.0	0	0	0	0	96	0.0	0	0	0	0	2
				[1]							[11]					
OPENBAD	1	203	0	81,012	2.9	0	0	0	0	2,676,863	95.0	0	0	560	0	1
QCLRSLV	1	1	13	265	0.0	0	0	0	0	567	0.0	0	0	0	0	2
*MATINVAT	1	0	0	75	0.0	0	0	0	0	75	0.0	0	0	0	0	3
*MATPTRIF	1	0	0	28	0.0	0	0	0	0	28	0.0	0	0	0	0	3
QLIADOPT	1	0	1	12	0.0	0	0	0	0	63	0.0	0	0	0	0	3
*RSLVSP	1	0	0	51	0.0	0	0	0	0	51	0.0	0	0	0	0	4
*DEQ	6	0	0	76	0.0	0	0	0	0	76	0.0	0	0	0	0	3
*ENQ	5	0	0	58	0.0	0	0	0	0	58	0.0	0	0	0	0	3
QCLCLCPR	100	0	500	11,708	0.4	0	0	0	0	61,612	2.2	0	0	0	0	2
*MATPTR	100	0	0	2,563	0.1	0	0	0	0	2,563	0.1	0	0	0	0	3
*RSLVSP	100	0	0	33,284	1.2	0	0	0	0	33,284	1.2	0	0	0	0	3
*MATSOBJ	100	0	0	8,734	0.3	0	0	0	0	8,734	0.3	0	0	0	0	3
*LOCKSL	100	0	0	3,086	0.1	0	0	0	0	3,086	0.1	0	0	0	0	3
*UNLOCKSL	100	0	0	2,221	0.1	0	0	0	0	2,221	0.1	0	0	0	0	3
				[2]												
OPEN5	100	1500	200	83,163	3.0	0	0	0	0	2,533,412	89.9	9	0	560	0	2
OPEN5/_QRNP_PEP_OPEN5																
*Alias	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	0	0	3
*MATINVIF	100	0	0	1,498	0.1	0	0	0	0	1,498	0.1	0	0	0	0	4
				[3]												
QDMCOPEN	500	500	3500	130,998	4.6	0	0	0	0	1,561,512	55.4	0	0	560	0	4
				[4]												
*MATINVIF	500	0	0	13,870	0.5	0	0	0	0	13,870	0.5	0	0	0	0	5
				[4]												
*RSLVSP	1000	0	0	208,948	7.4	0	0	0	0	208,948	7.4	0	0	0	0	5
				[4]												
*MATPTR	500	0	0	10,229	0.4	0	0	0	0	10,229	0.4	0	0	0	0	5
				[4]												
*CRTDOBJ	500	0	0	319,520	11.3	0	0	30	0	319,520	11.3	0	0	30	0	5
				[4]												
*SETACST	500	0	0	24,508	0.9	0	0	0	0	24,508	0.9	0	0	0	0	5
				[4]												
*LOCK	500	0	0	35,306	1.3	0	0	0	0	35,306	1.3	0	0	0	0	5
				[5]												
QDBOPEN	500	0	1500	62,455	2.2	0	0	0	0	817,628	29.0	0	0	530	0	5
				[6]												
*MATPTR	500	0	0	13,217	0.5	0	0	0	0	13,217	0.5	0	0	0	0	6
				[6]												
*CRTS	500	0	0	621,427	22.1	0	0	530	0	621,427	22.1	0	0	530	0	6
				[6]												
*ACTCR	500	0	0	113,622	4.0	0	0	0	0	113,622	4.0	0	0	0	0	6

*Figure 15 (Part 3 of 4). STATS HIER - Full Opens SHARE(*NO) Example*

```
Library . . : QPEXDATA
Member. . . : H_OPENBAD
Description : OPENBAD PEX HIER EXAMPLE
                                  +---------------- Inline Stats ------------++------------- Cumulative Stats -----------+
              Times    Calls MI CPLX          CPU        DB    DB    NDB   NDB            CPU        DB    DB    NDB   NDB  Call
Name         Called     Made  Issued        (us) /   %   SIO   AIO   SIO   AIO         (us) /   %   SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
QDBGETM         500        0    1000        34,412  1.2     0     0     0     0       393,360 14.0     0     0     0     0     4
*MATPTR         500        0       0        11,157  0.4     0     0     0     0        11,157  0.4     0     0     0     0     5
*RETSDSE        500        0       0       347,752 12.3     0     0     0     0       347,752 12.3     0     0     0     0     5
                                          7
QDMCLOSE        500      500    3000        57,260  2.0     0     0     0     0       492,210 17.5     0     0     0     0     4
*MATPRATR       500        0       0         7,339  0.3     0     0     0     0         7,339  0.3     0     0     0     0     5
*MATPTR         500        0       0        11,431  0.4     0     0     0     0        11,431  0.4     0     0     0     0     5
                                          8
QDBCLOSE        500        0       0         8,316  0.3     0     0     0     0         8,316  0.3     0     0     0     0     5
*DESS           500        0       0       184,942  6.6     0     0     0     0       184,942  6.6     0     0     0     0     5
*MODSOBJ        500        0       0         3,116  0.1     0     0     0     0         3,116  0.1     0     0     0     0     5
*DESCR          500        0       0       202,512  7.2     0     0     0     0       202,512  7.2     0     0     0     0     5
*UNLOCK         500        0       0        17,088  0.6     0     0     0     0        17,088  0.6     0     0     0     0     5
                                          9
*DEACTPG        100        0       0         1,345  0.0     0     0     0     0         1,345  0.0     0     0     0     0     4
QCLRTNE           1        0       0            22  0.0     0     0     0     0            22  0.0     0     0     0     0     2
```

*Figure 15 (Part 4 of 4). STATS HIER - Full Opens SHARE(*NO) Example*

Notes for STATS HIER OPENBAD Example:

This report shows us the program flow; the Call Level column is filled in with invocation level numbers because the definition used to collect the data was STATS HIER.

1 We called program OPENBAD once and it ran at call level 1. Cumulatively, this program used 95% of the CPU used during the PEX measurement. However, its direct CPU was only 2.9%, indicating that a program it called was responsible for most of the CPU. These results are consistent with those in the STATS FLAT example, see Figure 14 on page 60.

2 Program OPEN5 was called 100 times, running at call level 2. Because control was not returned to call level 1 (**1**), we know that this program was called by program OPENBAD running at call level 1. Cumulatively, this program used 89.9% of the CPU used during the PEX measurement; however, it directly used 3%. This indicates that most of the CPU is being used by a program running at a lower call stack level than program OPEN5. So we need to check what is happening at call stack levels below 2 (for example, three or higher) to see what they are doing.

Notice the ***Alias** entry following the OPEN5 PEP entry (OPEN5/_QRNP_PEP_OPEN5). *Alias shows up for each ILE PEP, and adds one to the Call Level for the programs called by the ILE program. This makes the call level value one higher than you expect. PTF MF14447 became available in January 1997; it eliminates the *Alias entry, and the call level numbers for ILE programs are what you expect. See Section 4.5, “PEX STATS HIER Example - Program at Multiple Levels” on page 83 for a hierarchical example with PTF MF14447 applied.

3 QDMCOPEN is running under program OPEN5. Recall that it is always called before a file open. Note that it was called 500 times and had a cumulative CPU figure of 55.4% and a direct CPU figure of 4.6%. Most CPU is being used by something QDMCOPEN is calling and not by

QDMCOPEN itself. Since QDMCOPEN is running at call level 4, we need to check what is happening at call levels 5 and below.

4 All these MI complex instructions are running under program QDMCOPEN. Note that the create duplicate object *CRTDOBJ MI complex instruction is using 11.3% of all CPU used by this single job and all tasks; this is expensive.

5 Here the full file open routine, QDBOPEN, used 29% of the cumulative CPU and 2.2% of the direct CPU. What is QDBOPEN calling that is so expensive?

6 These MI complex instructions are using a lot of CPU. Note that here the create space *CRTS instruction is responsible for 22.1% of the CPU used (see **B** for the exact total used). Also, it is the *CRTS instruction that is responsible for the 530 synchronous non-database IOs. Actually, the *CRTDOBJ instruction running under program QDMCOPEN is responsible for another 30 synchronous non-database IOs, which is why the total cumulative figure against program OPENBAD in **1** is 560.

7 This is the data management file close routine, always called as part of close file processing, irrespective of how database actually does the close.

8 Here is the database full file close routine, QDBCLOSE, clearly showing that we are not using shared file opens because we issued 500 calls to the full db file open routine QDBOPEN (see **5**) and 500 calls to this full db file close routine.

9 This MI complex instruction performs a deactivate program (*DEACTPG) indicating that all resources scoped to the program are being returned to the system. These resources might include static storage or an activation group.

10 This job used 96.77% of the Total Raw CPU as shown in **A** in the Stats CPU Summary Information Section. The Raw CPU figure is used to show the percentage each job is using, as we cannot make adjustments for PEX overhead at the job/task level. Such adjustment overhead can be made only at the program or procedure level.

In this example, we collected data for one job and all tasks. Thus, the CPU represents 96.77% of all the CPU used by this one job and all the tasks on the system - it does not represent 96.77% of all used CPU at the time of the trace (because there may be other jobs using a lot of CPU and the CPU data for these jobs was not included in this measurement; however, the task CPU data for all jobs is included in this measurement).

11 This program used 95% of the Total CPU as shown in **B** in the Stats CPU Summary Information Section. This is because at the program (or procedure) statistics level we are able to remove the PEX collection overhead.

A The definition used to collect this data specified only one job. Thus, this figure represents the CPU used by the one job and all tasks on the system, including any PEX collection overhead.

Note that work done by tasks on behalf of our one job is not pro-rated. That is, the report includes all LIC task work, not just LIC task work done on behalf of the jobs specified in the STATS collection (JOB keyword).

Please be sure you read remarks **B**, **C**, and **D** before using any CPU total figures in this report.

B Note that this figure is used as the base total CPU figure for the percentage calculations in the Statistics Information section. This is because the CPU overhead of PEX data collection can be removed at the program level, so this figure is more accurate when reviewing individual program percentage statistics.

Please be sure you read remarks **A**, **C**, and **D** before using any CPU total figures in this report.

Be Careful on PEX CPU Utilization Removal

Since this example was created, it has been determined that there are IBM software problems with the removal of CPU overhead charged to the PEX STATS performance data collection itself. As a result, V3R6 PTF SF37834 and V3R7 PTF SF38029 were created during January, 1997. These PTFs omit the removal of PEX data collection CPU overhead. See Appendix D, “Performance Explorer PTF Summary” on page 489 for additional details. The PEX STATS HIER example shown in Section 4.5, “PEX STATS HIER Example - Program at Multiple Levels” on page 83 shows report output with PTF SF37834 applied. You can tell the PTF has been applied by observing that fields *Overhead Removed* and *Total Raw CPU* do not appear on the report.

C When doing PEX STATS DTAORG(*FLAT) MRGJOB(*NO), there is a partition section for each of the number of jobs included in the collection, except for the special Partition 0 section. Partition 0 represents all LIC tasks and all jobs included in the collection (ADDPEXDFN command JOB parameter. If you specified MRGJOB(*YES), Partition 1 (all jobs) should follow Partition 0 statistics. If you specified MRGJOB(*NO), you should have Partition 1 through Partition n, where n represents the number of jobs for which data was collected.

Do not use the data in *Stats CPU Summary Information* Partition 0 of a PEX STATS DTAORG(*HIER) report to represent the totals for the job you are investigating. Use Partition 1 statistics.

Partition ″n″ means the following pages are for a specific job and the actual job name appears two pages following its associated Partition page. Therefore, if you had collect data for five jobs, there are six partition sections, zero and partition one through partition five. (For an example of a PRTPEXRPT showing multiple partitions, see Section 4.4, “PEX STATS FLAT Example - Merge Jobs *NO” on page 77.)

Please be sure you read remarks **A**, **B**, and **D** before using any CPU total figures in this report.

D In this example, where a single job was tracked, the total figures in Partition 1 relate to our single job. Thus the program and job percentage figures are based against total figures from this section.

Please be sure you read remarks **A**, **B**, and **C** before using any CPU total figures in this report.

E This is the Task Dispatcher Element (TDE) number for the single job we were tracking.

F LIC Task CFINTn, where n represents the CFINT task for a specific processor, is the only LIC task included in every Partition 1 through Partition n report section. CFINT is a processor specific interrupt handler that normally consumes little CPU utilization. There are up to four of these (CFINT1-CFINT4) tasks for the current maximum supported number of CPU processors on a single system (530-2153, 530-2162, 53S-2156, 53S-2157 support 4 processors). See Appendix C, "AS/400 LIC Tasks (Partial List)" on page 485 for a list of LIC tasks and a brief description of their functions.

Refer to Appendix A, "AS/400 MI Complex Instructions (Partial List)" on page 433 for a list of MI Complex Instructions and Appendix B, "AS/400 Modules (Partial List)" on page 437 for a list of AS/400 module names.

The next example (Section 4.3, "PEX STATS FLAT Example - Good File Opens") shows file opens that are shared opens.

Be Careful When Reviewing Partition Sections

When you produce a PEX STATS HIER report for, say three jobs, ensure that you use partitions 1, 2, and 3 to represent the CPU totals for each of the three jobs. In order to determine the job name to which a Partition and its associated information relate, locate the Task Information section immediately following the Stats CPU Summary section in which the Partition n appears; the job or jobs to which the partition relates are listed in this section. For further explanation, please refer to Section 3.2.3, "Sequence of STATS Report Sections" on page 46.

4.3 PEX STATS FLAT Example - Good File Opens

This example shows program OPENGOOD calling program OPEN5 100 times, where program OPEN5 opens 5 database files each time it is called. The only difference between this example and the OPENBAD FLAT example in Figure 14 on page 60 is that this example used shared file opens. Specifically, program OPENGOOD issued the OVRDBF... SHARE(*YES) and OPNDBF commands prior to calling program OPEN5.

```
                                          Performance Explorer Report                    8/12/96 16:15:39
                                            Definition Information                              Page
                                                                                                   1
Library . . : QPEXDATA
Member. . . : F_OPENGOOD
Description : OPENGOOD STATS FLAT EXAMPLE
Type . . . . . . . . . . . . : STATISTICS
Definition Name. . . . . . . : S_1J_F
Defined By . . . . . . . . . : A960123A
Definition Description . . . : Stats FLAT for 1 Job Only, Merge jobs *yes
Data Organization. . . . . . : FLAT
Overhead Subtraction . . . . : YES
Merge Jobs . . . . . . . . . : YES
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
                                          Performance Explorer Report                    8/12/96 16:15:39
                                               Run Information                                Page
                                                                                                   2
Library . . : QPEXDATA
Member. . . : F_OPENGOOD
Description : OPENGOOD STATS FLAT EXAMPLE
Sessions since IPL. . . . . . . . . . . . . :                        229
Session name. . . . . . . . . . . . . . . . : F_OPENGOOD
Start time. . . . . . . . . . . . . . . . . : 1996-08-12-16.14.58.740360
Stop time . . . . . . . . . . . . . . . . . : 1996-08-12-16.15.16.454656
Total time  DD-HH.MM.ss.uuuuuu. . . . . . . :         00-00.00.17.714296
Suspend time (us) . . . . . . . . . . . . . :                    156,200
Number of events. . . . . . . . . . . . . . :                     16,218
Trace wrap count. . . . . . . . . . . . . . :                          0
Job creating session. . . . . . . . . . . . : P23XWY32E A960123A  054089
Started by user . . . . . . . . . . . . . . : A960123A
Target system . . . . . . . . . . . . . . . : ITSOM05
Serial number . . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . . :                     98,304
OS/400 level. . . . . . . . . . . . . . . . : 5ON
Version . . . . . . . . . . . . . . . . . . : V3R6M0
Configured ASPs . . . . . . . . . . . . . . :                          1
Logical DASDs . . . . . . . . . . . . . . . :                          7
Data areas. . . . . . . . . . . . . . . . . :                          1
Jobs/tasks in session . . . . . . . . . . . :                        179
Jobs in session . . . . . . . . . . . . . . :                          1
                                          Performance Explorer Report                    8/12/96 16:15:39
                                        Stats CPU Summary Information                           Page
                                                                                                   3
Library . . . . . :  QPEXDATA
Member. . . . . . :  F_OPENGOOD
Description . . . :  OPENGOOD STATS FLAT EXAMPLE
Partition . . . . :          1
Total Raw CPU . . :       873232  A
Overhead Removed. :       256083
Total CPU . . . . :       617149  B
Task CPU. . . . . :        24336     3.9 %
Job CPU . . . . . :       592813    96.1 %
                  ----------------------
   Pgm/Mod CPU. . :       581781    94.3 %
   Unknown CPU. . :        11032     1.8 %
                                          Performance Explorer Report                    8/12/96 16:15:39
                                            Statistics Information                        Page    3
                                               Library Section
Library . . : QPEXDATA
Member. . . : F_OPENGOOD
Description : OPENGOOD STATS FLAT EXAMPLE
                                +---------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX              CPU        DB    DB   NDB   NDB              CPU        DB    DB   NDB   NDB  Call
Name        Called    Made  Issued          (us) /   %    SIO   AIO   SIO   AIO          (us) /   %    SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
HATT           101    1751     200        159,085 25.8      0     0     0     0        993,443 ****      0     0     0     0     0
QSYS          2989    1326    4600        226,679 36.7      0     0     0     0        687,379 ****      0     0     4     0     0
MI CPLX       4811       0       0        196,017 31.8      0     0     1     0        196,017 31.8      0     0     1     0     0
**LIC Task       0       0       0         24,336  3.9      0     0     0     0         24,336  3.9      0     0     0     0     0
**Unknown        0       0       0         11,031  1.8      0     0     0     0         11,031  1.8      0     0     0     0     0
```

*Figure 16 (Part 1 of 3). STATS FLAT - Full Opens SHARE(*YES) Example*

```
Library . . : QPEXDATA
Member. . . : F_OPENGOOD
Description : OPENGOOD STATS FLAT EXAMPLE
```

Task ID	Job/Task Name	Pool	Priority	Existence Start	Existence End	Elapsed Time (us)	Run Time (us)	Run Time Percent	
44270	P23XWY32E A960123A 054089	4	160	Y	Y	15907520	848896	97.21	8
40644	PA-T-P23XWY32E	1	40	Y	Y	15907528	3464	0.40	
276	IPR3050103--2619	1	10	Y	Y	15889096	6536	0.75	
146	SMXCSPRVSR	1	79	Y	Y	15884104	304	0.03	
122	SK-ASC002	1	70	Y	Y	15881536	640	0.07	
105	SMP00004	1	1	Y	Y	15878840	2808	0.32	
85	RMTMSAFETASK	1	0	Y	Y	15876448	568	0.07	
82	XMSPDBUS01000000	1	10	Y	Y	15876448	24	0.00	

*Figure 16 (Part 2 of 3). STATS FLAT - Full Opens SHARE(*YES) Example*

Library . . : QPEXDATA
Member. . . : F_OPENGOOD
Description : OPENGOOD STATS FLAT EXAMPLE

				Inline Stats					Cumulative Stats							
Name	Times Called	Calls Made	MI CPLX Issued	CPU (us)	/ %	DB SIO	DB AIO	NDB SIO	NDB AIO	CPU (us)	/ %	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
	1										9					
OPENGOOD	1	251	0	85,519	13.9	0	0	0	0	675,106	****	0	0	0	0	0
	2															
OPEN5	100	1500	200	73,565	11.9	0	0	0	0	318,336	51.6	0	0	0	0	0
	3															
QDMCOPEN	506	1011	545	72,197	11.7	0	0	0	0	138,469	22.4	0	0	0	0	0
QDBGETSQ	500	0	1500	25,804	4.2	0	0	0	0	75,020	12.2	0	0	0	0	0
QCLCLCPR	100	0	500	10,162	1.6	0	0	0	0	58,445	9.5	0	0	0	0	0
QDMCLOSE	506	6	1040	26,831	4.3	0	0	0	0	50,100	8.1	0	0	0	0	0
QPTPARML	1	6	1	260	0.0	0	0	0	0	46,465	7.5	0	0	1	0	0
*RSLVSP	145	0	0	39,248	6.4	0	0	0	0	39,248	6.4	0	0	0	0	0
QPTPRCSS	1	56	0	3,634	0.6	0	0	0	0	38,340	6.2	0	0	1	0	0
QMHRCVPM	5	2	36	1,019	0.2	0	0	0	0	28,549	4.6	0	0	0	0	0
QDMGETOV	510	0	510	17,614	2.9	0	0	0	0	28,103	4.6	0	0	0	0	0
*SETCR	500	0	0	27,247	4.4	0	0	0	0	27,247	4.4	0	0	0	0	0
*MATPTR	1228	0	0	26,504	4.3	0	0	0	0	26,504	4.3	0	0	0	0	0
QMHGSD	2	61	36	3,038	0.5	0	0	0	0	26,120	4.2	0	0	0	0	0
**LIC Task	0	0	0	24,336	3.9	0	0	0	0	24,336	3.9	0	0	0	0	0
*MATINVIF	1198	0	0	24,208	3.9	0	0	0	0	24,208	3.9	0	0	0	0	0
	4															
QDBOPENC	5	15	5	690	0.1	0	0	0	0	17,098	2.8	0	0	0	0	0
QWSGET	12	5	12	2,454	0.4	0	0	0	0	15,850	2.6	0	0	0	0	0
QT3REQIO	9	0	18	531	0.1	0	0	0	0	13,481	2.2	0	0	0	0	0
	5															
QDBSOPEN	500	0	0	12,743	2.1	0	0	0	0	12,743	2.1	0	0	0	0	0
QCADRV	16	53	32	2,929	0.5	0	0	0	0	12,337	2.0	0	0	0	0	0
*DEQWAIT	6	0	0	11,714	1.9	0	0	0	0	11,714	1.9	0	0	0	0	0
QUIMGFLW	2	14	0	846	0.1	0	0	0	0	11,381	1.8	0	0	0	0	0
*RETDSEN	500	0	0	11,104	1.8	0	0	0	0	11,104	1.8	0	0	0	0	0
**Unknown	0	0	0	11,031	1.8	0	0	0	0	11,031	1.8	0	0	0	0	0
QUIEXFMT	2	6	0	643	0.1	0	0	0	0	8,779	1.4	0	0	0	0	0
QPTGTINP	3	9	6	4,819	0.8	0	0	0	0	8,021	1.3	0	0	0	0	0
*MATSOBJ	101	0	0	7,856	1.3	0	0	0	0	7,856	1.3	0	0	0	0	0
QDBCLOSC	5	10	5	410	0.1	0	0	0	0	7,315	1.2	0	0	0	0	0
QMHRTMSS	21	0	82	3,335	0.5	0	0	0	0	7,222	1.2	0	0	0	0	0
QWSPUT	23	6	25	4,561	0.7	0	0	0	0	6,954	1.1	0	0	0	0	0
	6															
*CRTS	8	0	0	6,845	1.1	0	0	0	0	6,845	1.1	0	0	0	0	0
QSFPUT	15	1	0	4,041	0.7	0	0	0	0	6,736	1.1	0	0	1	0	0
*MATPRATR	515	0	0	6,633	1.1	0	0	0	0	6,633	1.1	0	0	0	0	0
	7															
QDBOPEN	5	0	15	662	0.1	0	0	0	0	6,588	1.1	0	0	0	0	0
QUIINMGR	2	4	0	1,292	0.2	0	0	0	0	6,506	1.1	0	0	0	0	0
QMHSNDPM	15	0	63	1,870	0.3	0	0	0	0	6,342	1.0	0	0	0	0	0
QCAFLD	29	0	1	4,614	0.7	0	0	0	0	4,679	0.8	0	0	0	0	0
QCADRV2	7	23	2	1,054	0.2	0	0	0	0	4,554	0.7	0	0	0	0	0
*FNDINXEN	53	0	0	4,492	0.7	0	0	0	0	4,492	0.7	0	0	0	0	0
QCMDEXC	2	8	12	650	0.1	0	0	0	0	4,335	0.7	0	0	0	0	0
QCARULE	20	0	40	960	0.2	0	0	0	0	4,049	0.7	0	0	0	0	0
	6															
*CRTDOBJ	6	0	0	4,019	0.7	0	0	0	0	4,019	0.7	0	0	0	0	0
	6															
*DESS	9	0	0	3,655	0.6	0	0	0	0	3,655	0.6	0	0	0	0	0
*LOCKSL	100	0	0	3,160	0.5	0	0	0	0	3,160	0.5	0	0	0	0	0

*Figure 16 (Part 3 of 3). STATS FLAT - Full Opens SHARE(*YES) Example*

Notes for STATS FLAT OPENGOOD Example:

Because this is STATS FLAT we do not get anything in the Call Level column on the report. This report was printed in descending cumulative CPU sequence.

1 We called program OPENGOOD once. Cumulatively, this program used 675106/617149 = 109.% of the CPU used by our job and any active tasks, after collection overhead has been removed.

Cumulative CPU PTF

In January of 1997, PEX PTF SF37834 became available that improved overhead calculations. With this PTF installed cumulative CPU time exceeds the collection time (which is impossible) in only a few cases. Development continues to work this issue.

We verified this change. However, we did not have time to rerun all these test programs to show adjusted values in these examples.

Compare the cumulative CPU figure of 675106 for OPENGOOD to the corresponding figure of 2681872 CPU microseconds for OPENBAD (see remark **8** in Figure 14 on page 60. The only difference between OPENGOOD and OPENBAD is that we used shared file opens in OPENGOOD and did not use them in OPENBAD. As a result of this difference, OPENGOOD uses 25.1% of the CPU used by OPENBAD. This infers that the CPU cost of a full database file open is at least 400% more than a shared file open.

2 Program OPEN5 was called 100 times. Cumulatively, it used 51.6% of the CPU used during the PEX measurement; however, it directly used 11.9%. Compare these figures to those for program OPEN5 when called from program OPENBAD (see Figure 14 on page 60). Note that under program OPENBAD we see OPEN5 using 2538660 CPU microseconds and under program OPENGOOD we see OPEN5 using 318336 CPU microseconds (12.5% of the CPU).

3 QDMCOPEN now uses considerably less CPU under OPENGOOD than it did under OPENBAD. This is not surprising; it is because QDMCOPEN is called for every full file open, and it needs significantly less CPU to service a shared file open than it does to service a full file open.

4 QDBOPENC is the command processing program for the CL OPNDBF command. QDBOPENC calls QDMCOPEN, which in turn calls either QDBOPEN for a full db file open or QDBSOPEN for a shared database file open.

5 QDBSOPEN is the database shared file open routine that is called when a file that is already open and has that open data path shared, is opened again with a compatible open option. These are using a lot of direct CPU. Note that the direct and cumulative CPU figure is identical for MI complex instructions as they do not call anything else.

After QDMCOPEN is called to process a database file open, either a full open (QDBOPEN) or a shared file open (QDBSOPEN) will result. Note that the CPU cost per invocation of QDBOPEN in the full opens example was 134.7 CPU microseconds and the cost per invocation of QDBSOPEN in this shared opens example is 25.5 CPU microseconds. Some customer systems have been known to perform in excess of 150 full database file opens per second and save significant CPU when shared opens are introduced.

6 Note that the create space *CRTS MI complex instruction is not showing any synchronous non-database IOs. Compare this to the OPENBAD example, where it did 526. Also, the number of times *CRTS

was called dropped from 503 in the full open case to eight in the shared open case. Since this instruction uses a lot of CPU per invocation, and we are now performing significantly less of them, this is one of the underlying reasons why shared opens are so much cheaper than full file opens.

Another example of an MI complex instruction that it called much less frequently in the shared open scenario is the destroy space *DESS instruction. The less often expensive MI complex instructions are called, the better is performance.

7 The full database file open routine QDBOPEN is called 5 times in this shared open example (OPENGOOD) compared to 500 times in the full opens example (OPENBAD). This is because in the OPENGOOD example the opens are being done by program OPENGOOD itself using the OPNDBF command and sharing the resultant open data path with program OPEN5, which issues 500 calls to QDBSOPEN. In the OPENBAD example, program OPENBAD does not open any files and does not use shared open data path overrides, therefore program OPEN5 fully opens 5 files every time it is called. Because it is called 100 times in total and fully terminates after each call, it issues 500 calls to system routine QDBOPEN.

8 This job used 97.21% of the Total Raw CPU as shown in **A** in the Stats CPU Summary Information Section. The Raw CPU figure is used to show the percentage each job is using, as we cannot make adjustments for PEX overhead at the job/task level. Such adjustment overhead can be made only at the program or procedure level.

9 This program used 107% of the Total CPU as shown in **B** in the Stats CPU Summary Information Section. This is because at the program (or procedure) statistics level we are able to remove the PEX collection overhead. (Remember, this report was generated before PT SF37834 had been applied. See the label box following **1** discussion for more information on this PTF.)

A The definition used to collect this data specified only one job. Thus, this figure represents the CPU used by the one job and all tasks on the system, including any PEX collection overhead.

B Note that this figure is used as the base total CPU figure for the percentage calculations in the Statistics Information section. This is because the CPU overhead of PEX data collection can be removed at the program level, so this figure is more accurate when reviewing individual program percentage statistics.

Be Careful on PEX CPU Utilization Removal

Since this example was created, it has been determined that there are IBM software problems with the removal of CPU overhead charged to the PEX STATS performance data collection itself. As a result, V3R6 PTF SF37834 and V3R7 PTF SF38029 were created during January, 1997. These PTFs omit the removal of PEX data collection CPU overhead. See Appendix D, “Performance Explorer PTF Summary” on page 489 for additional details. The PEX STATS HIER example shown in Section 4.5, “PEX STATS HIER Example - Program at Multiple Levels” on page 83 shows report output with PTF SF37834 applied. You can tell the PTF has been applied by observing that fields *Overhead Removed* and *Total Raw CPU* do not appear on the report.

4.4 PEX STATS FLAT Example - Merge Jobs *NO

The purpose of this example is to enable you to correctly interpret a STATS report produced from data collected with a definition using MERGE JOBS *NO.

First, find jobs or programs that are using the most resource. Use either the Performance Monitor with trace and review the Transaction Reports, or run a PEX collection using a PEX STATS DTAORG(*FLAT) with a definition covering all jobs and MRGJOBS(*YES).

Use PEX STATS FLAT with a definition specifying MRGJOBS(*NO) in order to see how certain jobs are using particular programs.

Why do this? Many package applications provide comprehensive search criteria against the database. During installation, setup, and education, it is agreed which of the many search criteria a particular customer will use. Indexes relating to the search agree search criteria are built; indexes for other search criteria are not built. New users join the customer; they are unaware of the **correct** search criteria to use and specify search fields for which there are no existing indexes (over millions of records). In this situation, certain users are using the application **differently**. We run PEX STATS FLAT MRGJOB(*NO) for all users of the search program and use the Statistics Information section for the traced users to see which users had the highest CPU utilization for this program.

Be Careful on PEX *HIER and MRGJOB(*NO) Performance Impact

PEX STATS HIER collections cause significantly greater overhead than PEX STATS FLAT collections. Running PEX using a definition with MRGJOBS(*NO) involves greater overhead than MRGJOBS(*YES), as separate counters must be maintained for all jobs in the collection.

Use PEX STATS HIER over only a small subset of jobs, not all jobs. A single job is preferred, if possible.

Use a PEX STATS definition with MRGJOBS(*NO) over only a small subset of jobs, not all jobs.

```
                                          Performance Explorer Report                    9/11/96 10:33:43
                                            Definition Information                              Page
                                                                                                   1

Library . . : DHPEX
Member. . . : FLATMRGNO
Description : *BLANK
Type . . . . . . . . . . . . : STATISTICS
Definition Name. . . . . . . : FLATMRGNO
Defined By . . . . . . . . . : A960123A
Definition Description . . . : EXAMPLE OF STATS FLAT MERGE JOBS *NO
Data Organization. . . . . . : FLAT
Overhead Subtraction . . . . : YES
Merge Jobs . . . . . . . . . : NO   1
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *ALL       *ALL       *ALL 1
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
```

```
                                          Performance Explorer Report                    9/11/96 10:33:43
                                                Run Information                               Page
                                                                                                   2

Library . . : DHPEX
Member. . . : FLATMRGNO
Description : *BLANK
Sessions since IPL. . . . . . . . . . . . . :                       104
Session name. . . . . . . . . . . . . . . . : FLATMRGNO
Start time. . . . . . . . . . . . . . . . . : 1996-09-11-10.32.56.593968
Stop time . . . . . . . . . . . . . . . . . : 1996-09-11-10.33.26.075048
Total time  DD-HH.MM.ss.uuuuuu. . . . . . . :         00-00.00.29.481080
Suspend time (us) . . . . . . . . . . . . . :                 1,413,152
Number of events. . . . . . . . . . . . . . :                     3,518
Trace wrap count. . . . . . . . . . . . . . :                         0
Job creating session. . . . . . . . . . . . : P23XWY32E A960123A  057164
Started by user . . . . . . . . . . . . . . : A960123A
Target system . . . . . . . . . . . . . . . : ITSOM05
Serial number . . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . . :                    98,304
OS/400 level. . . . . . . . . . . . . . . . : 50N
Version . . . . . . . . . . . . . . . . . . : V3R6M0
Configured ASPs . . . . . . . . . . . . . . :                         1
Logical DASDs . . . . . . . . . . . . . . . :                         7
Data areas. . . . . . . . . . . . . . . . . :                       290 2
Jobs/tasks in session . . . . . . . . . . . :                       290
Jobs in session . . . . . . . . . . . . . . :                       122
```

*Figure 17 (Part 1 of 4). STATS FLAT Merge Jobs(*NO) Example*

```
                                        Performance Explorer Report                          9/11/96 10:33:43
                                        Stats CPU Summary Information                              Page
                                                                                                      3

Library . . . . . :  DHPEX
Member. . . . . :  FLATMRGNO
Description . . . :  *BLANK
Partition . . . . :          0    3
Total Raw CPU . . :       758672  4
Overhead Removed. :        93595
Total CPU . . . . :       665077  5
Task CPU. . . . . :        66968    10.1 %
Job CPU . . . . . :       598109    89.9 %
                     ----------------------
   Pgm/Mod CPU. . :       523757    78.8 %
   Unknown CPU. . :        74352    11.2 %
```

```
                                        Performance Explorer Report                          9/11/96 10:33:43
                                             Task Information                                      Page

Library . . : DHPEX
Member. . . : FLATMRGNO
Description : *BLANK
Task ID    Job/Task Name                Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                      Start/End                                          Percent
-------------------------------------------------------------------------------------------------------------------
 7  5646 P23XWY32G  A960123A   057165     4      160   Y    Y        27187736               239688     31.59  6
 8  5645 P23XWY32E  A960123A   057164     4      160   Y    Y        27187736               253760     33.45  6
(lines removed for brevity)
       1  CFINT1                         0        0   Y    Y        27187736                36976      4.87
-------------------------------------------------------------------------------------------------------------

                                                                                          758672
```

```
                                        Performance Explorer Report                          9/11/96 10:33:43
                                        Stats CPU Summary Information                              Page
                                                                                                     11

Library . . . . . :  DHPEX
Member. . . . . :  FLATMRGNO
Description . . . :  *BLANK
Partition . . . . :          1    9
Total Raw CPU . . :       276664  10
Overhead Removed. :        30025
Total CPU . . . . :       246639  11
Task CPU. . . . . :        36976    15.0 %
Job CPU . . . . . :       209663    85.0 %
                     ----------------------
   Pgm/Mod CPU. . :       192959    78.2 %
   Unknown CPU. . :        16704     6.8 %
```

*Figure 17 (Part 2 of 4). STATS FLAT Merge Jobs(*NO) Example*

```
                                        Performance Explorer Report                          9/11/96 10:33:43
                                          Statistics Information                                   Page   11

                                                  Library Section
Library . . : DHPEX                                12
Member. . . : FLATMRGNO
Description : *BLANK
                                +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
              Times   Calls MI CPLX              CPU        DB    DB   NDB   NDB              CPU        DB    DB   NDB   NDB  Call
Name         Called    Made  Issued          (us) /   %    SIO   AIO   SIO   AIO          (us) /   %    SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
HATT             12      36      99        167,947 68.1      0     0     0     0        193,307 78.4      0     0     0     0     0
**LIC Task        0       0       0         36,975 15.0      0     0     0     0         36,975 15.0      0     0     0     0     0
**Unknown         0       0       0         16,704  6.8      0     0     0     0         16,704  6.8      0     0     0     0     0
QSYS            122      82     102         12,937  5.2      0     0     0     0         36,834 14.9      0     0     0     0     0
MI CPLX         207       0       0         12,075  4.9      0     0     0     0         12,075  4.9      0     0     0     0     0


                                        Performance Explorer Report                          9/11/96 10:33:43
                                             Task Information                                       Page
                                                                                                      13
Library . . : DHPEX
Member. . . : FLATMRGNO
Description : *BLANK
Task ID    Job/Task Name                Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                      Start/End                                          Percent
-------------------------------------------------------------------------------------------------------------------------------
 13  5646 P23XWY32G  A960123A   057165     4      160   Y    Y       27187736              239688     86.64  14
        1 CFINT1                          0        0   Y    Y       27187736               36976     13.36
-------------------------------------------------------------------------------------------------------------------------------
                                                                                          276664


                                        Performance Explorer Report                          9/11/96 10:33:43
                                          Statistics Information  15                             Page   14
Library . . : DHPEX
Member. . . : FLATMRGNO
Description : *BLANK
                                +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
              Times   Calls MI CPLX              CPU        DB    DB   NDB   NDB              CPU        DB    DB   NDB   NDB  Call
Name         Called    Made  Issued          (us) /   %    SIO   AIO   SIO   AIO          (us) /   %    SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
ILEAGNEW          1      36      88        167,007 67.7      0     0     0     0        191,245 77.5      0     0     0     0     0
**LIC Task        0       0       0         36,975 15.0      0     0     0     0         36,975 15.0      0     0     0     0     0
**Unknown         0       0       0         16,704  6.8      0     0     0     0         16,704  6.8      0     0     0     0     0
QSQENDAG         11       0       0          5,070  2.1      0     0     0     0          5,070  2.1      0     0     0     0     0
 (lines removed for brevity)
```

*Figure 17 (Part 3 of 4). STATS FLAT Merge Jobs(*NO) Example*

```
                                        Performance Explorer Report                    9/11/96 10:33:43
                                      Stats CPU Summary Information                          Page
                                                                                               16

Library . . . . . :  DHPEX
Member. . . . . :  FLATMRGNO
Description . . . :  *BLANK
Partition . . . . :          2    16
Total Raw CPU . . :       253760  17
Overhead Removed. :        37625
Total CPU . . . . :       216135  18
Task CPU. . . . . :            0     0.0 %
Job CPU . . . . . :       216135   100.0 %
                  ----------------------
   Pgm/Mod CPU. . :       205359    95.0 %
   Unknown CPU. . :        10776     5.0 %
                                        Performance Explorer Report                    9/11/96 10:33:43
                                          Statistics Information                               Page
                                                                                               17

                                             Library Section
Library . . : DHPEX                                19
Member. . . : FLATMRGNO
Description : *BLANK
                              +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX             CPU        DB    DB   NDB   NDB             CPU        DB    DB   NDB   NDB  Call
Name        Called    Made  Issued          (us) /   %    SIO   AIO   SIO   AIO          (us) /   %    SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
HATT             9      27      72        123,452 57.1      0     0     0     0        135,827 62.8      0     0     0     0     0
QSYS           275     245     298         48,191 22.3      0     0     0     0        239,279 ****      0     0     4     0     0
MI CPLX        381       0       0         33,714 15.6      0     0     1     0         33,714 15.6      0     0     1     0     0
**Unknown        0       0       0         10,776  5.0      0     0     0     0         10,776  5.0      0     0     0     0     0
**LIC Task       0       0       0              0  0.0      0     0     0     0              0  0.0      0     0     0     0     0
                                        Performance Explorer Report                    9/11/96 10:33:43
                                             Task Information                                  Page
                                                                                               18
Library . . : DHPEX
Member. . . : FLATMRGNO
Description : *BLANK
Task ID    Job/Task Name                Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                      Start/End                                          Percent
-------------------------------------------------------------------------------------------------------------------------------
 20  5645 P23XWY32E  A960123A   057164     4      160   Y    Y       27187736              253760         100  21
-------------------------------------------------------------------------------------------------------------------------------
                                                                                          253760

                                        Performance Explorer Report                    9/11/96 10:33:43
                                          Statistics Information  22                   Page   19
Library . . : DHPEX
Member. . . : FLATMRGNO
Description : *BLANK
                              +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX             CPU        DB    DB   NDB   NDB             CPU        DB    DB   NDB   NDB  Call
Name        Called    Made  Issued          (us) /   %    SIO   AIO   SIO   AIO          (us) /   %    SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
ILEAGNEW         1      27      64        122,729 56.8      0     0     0     0        134,238 62.1      0     0     0     0     0
**Unknown        0       0       0         10,776  5.0      0     0     0     0         10,776  5.0      0     0     0     0     0
QPTGTINP         3      12       6          8,450  3.9      0     0     0     0         11,427  5.3      0     0     0     0     0
  (lines removed for brevity)
```

*Figure 17 (Part 4 of 4). STATS FLAT Merge Jobs(*NO) Example*

Notes for STATS FLAT Merge Jobs *NO Example:

All CPU figures are in microseconds. Divide microseconds by 1000 to get milliseconds.

1 Separate statistics are kept for each job/task involved in the collection.

2 This collection involved 290 jobs/tasks, so 290 separate data areas are used to store each job/task's statistics.

3 Whenever separate job/task statistics are kept by PEX STATS (merge jobs NO is used) an overall section that includes statistics for all

jobs/tasks involved in the collection is kept. These overall statistics are in the Stats CPU Summary Information section that is for Partition 0.

The presence of a Partition 0 entry in the Stats CPU Summary Information section implies that the STATS collection either used DTAORG(*FLAT) MRGJOB(*NO) or DTAORG(*HIER).

4 This is the total CPU for all jobs/tasks involved in the collection, including PEX collection CPU overhead.

This figure only represents the total system-wide used CPU if all jobs/tasks were involved in the collection. New jobs started after PEX collection has begun are included in this figure (when statistics for all jobs are being collected).

5 This is the total CPU for all jobs/tasks involved in the collection, with the PEX collection CPU overhead removed.

6 The Run Time Percent (from the Partition 0 statistics) represents the CPU percent used by each job in the collection. The total CPU figure used to calculate this percentage is **4**.

If a collection covered all jobs, this run time percent represents the percent of used CPU that was used by individual jobs.

7 Partition 0 Task Information list contains a list of all jobs/tasks involved in the trace. The relative position of a job on this list does not imply its Partition number in the following sections. This list is in descending TDE number sequence. If another job had started processing *after* PEX collection had been started, it is a newer job with a higher TDE number than all the jobs already existing. This new job would appear first on the Task Information list for Partition 0. However, it does not appear under Partition 1, as Partition 1 relates to the job with the highest TDE number that existed at the time the collection was started.

You must manually match this job with the Task Information section of Partition n, where n is non-zero, in order to find its program statistics in the Statistics Information section.

This job happens to appear under Partition 1 in this report, as no new jobs were started after PEX collection was started. **8**

This job happens to appear under Partition 2 in this report, as no new jobs were started after PEX collection was started.

9 To find which job Partition 1 refers to, locate the Task Information section *following* the Partition 1 Stats CPU Summary Information section. The job Partition 1 refers to is shown in **13** in this example.

10 This is the total CPU for the single job/task shown in **13**, including PEX collection CPU overhead.

11 This is the total CPU for the single job/task shown in **13**, with the PEX collection CPU overhead removed.

12 The figures in this Library Section relate to the single job shown in **13** in the Task Information Section. The total CPU figure used for percentage calculation is **11**.

13 This is the name of the job known as Partition 1 (see **9**).

14 The total CPU figure used for percentage calculation is **10**.

15 This Statistics Information section applies to job number 057165 only, as it only relates to Partition 1 (see **13** for full job name). The total CPU figure used for percentage calculation is **11**.

16 To find which job Partition 2 refers to, locate the Task Information section *following* the Partition 2 Stats CPU Summary Information section. The job Partition 2 refers to is shown in **20** in this example.

17 This is the total CPU for the single job/task shown in **20**, including PEX collection CPU overhead.

18 This is the total CPU for the single job/task shown in **20**, with the PEX collection CPU overhead removed.

Be Careful on PEX CPU Utilization Removal

Since this example was created, it has been determined that there are IBM software problems with the removal of CPU overhead charged to the PEX STATS performance data collection itself. As a result, V3R6 PTF SF37834 and V3R7 PTF SF38029 were created during January, 1997. These PTFs omit the removal of PEX data collection CPU overhead. See Appendix D, “Performance Explorer PTF Summary” on page 489 for additional details. The PEX STATS HIER example shown in Section 4.5, “PEX STATS HIER Example - Program at Multiple Levels” shows report output with PTF SF37834 applied. You can tell the PTF has been applied by observing that fields *Overhead Removed* and *Total Raw CPU* do not appear on the report.

19 The figures in this Library Section relate to the single job shown in **20** in the Task Information Section. The total CPU figure used for percentage calculation is **16**.

20 This is the name of the job known as Partition 2 (see **16**).

21 The total CPU figure used for percentage calculation is **17**.

22 This Statistics Information section applies to job number 057164 only, as it only relates to Partition 2 (see **20** for full job name). The total CPU figure used for percentage calculation is **18**.

4.5 PEX STATS HIER Example - Program at Multiple Levels

This example is a STATS HIER example that is used as a basis for the PEX PROFILE example described in Chapter 5, “Performance Explorer *PROFILE Option” on page 103. It includes the same program (COMPTIMEE) being called at multiple call levels to show you how to identify this in a PRTPEXRPT.

Command CMDCSTPEXH interfaces to user program CLCSTPEXHI. CKCSTPEXHI interfaces to two programs, COMPTIMEE and CSTPEX. Program CSTPEX also calls COMPTIMEE.

Program CLCSTPEXHI sets up the database files, file members, and file libraries to be processed by program CSTPEX.

CSTPEX reads thousands of records from file CSTFIL and then randomly retrieves a single record from ITMFIL. CSTPEX also performs several heavy duty multiply and divide functions.

We use PEX STATS HIER to find the program taking significant CPU and in Chapter 5, “Performance Explorer *PROFILE Option” we use PEX PROFILE to identify the high CPU consumption application program statements. Notes for the figure parts follow the last part of Figure 18.

```
                                  Performance Explorer Report                  2/05/97 16:25:19
                                    Definition Information                            Page
                                                                                         1

Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
Type . . . . . . . . . . . . : STATISTICS
Definition Name. . . . . . . : RBSTAT1JOH
Defined By . . . . . . . . . : COOL
Definition Description . . . : RB STAT FOR *HIER TEST of CMDCSTPEXH
Data Organization. . . . . . : HIER
Overhead Subtraction . . . . : YES
Merge Jobs . . . . . . . . . : NO
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
```

Figure 18 (Part 1 of 14). STATS HIER Example - Program Called at Multiple Levels

```
                                  Performance Explorer Report                  2/05/97 16:25:19
                                        Run Information                             Page
                                                                                         2

Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
Sessions since IPL. . . . . . . . . . . . . :                          2
Session name. . . . . . . . . . . . . . . . : COOLSHI
Start time. . . . . . . . . . . . . . . . . : 1997-02-05-16.23.23.551048
Stop time . . . . . . . . . . . . . . . . . : 1997-02-05-16.24.52.920640
Total time  DD-HH.MM.ss.uuuuuu. . . . . . . :         00-00.01.29.369592
Suspend time (us) . . . . . . . . . . . . . :                    211,432
Number of events. . . . . . . . . . . . . . :                      4,502
Trace wrap count. . . . . . . . . . . . . . :                          0
Job creating session. . . . . . . . . . . . : COOLPCF   COOL      070512
Started by user . . . . . . . . . . . . . . : COOL
Target system . . . . . . . . . . . . . . . : ITSOMO5
Serial number . . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . . :                    131,072 B
OS/400 level. . . . . . . . . . . . . . . . : 50N
Version . . . . . . . . . . . . . . . . . . : V3R6MO
Configured ASPs . . . . . . . . . . . . . . :                          1
Logical DASDs . . . . . . . . . . . . . . . :                          9
Data areas. . . . . . . . . . . . . . . . . :                        187
Jobs/tasks in session . . . . . . . . . . . :                        187
Jobs in session . . . . . . . . . . . . . . :                          1
```

Figure 18 (Part 2 of 14). STATS HIER Example - Program Called at Multiple Levels

```
                                          Performance Explorer Report                    2/05/97 16:25:19
                                         Stats CPU Summary Information                         Page
                                                                                                  3

Library . . . . . :  COOL
Member. . . . . :  COOLSHI
Description . . . :  STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
Partition . . . . :          0
Total CPU . . . . :     10247176 A
Task CPU. . . . . :       292040     2.8 %
Job CPU . . . . . :      9955136    97.2 %
                  ----------------------
   Pgm/Mod CPU. . :      9945072    97.1 %
   Unknown CPU. . :        10064     0.1 %
```

Figure 18 (Part 3 of 14). STATS HIER Example - Program Called at Multiple Levels

```
                                          Performance Explorer Report                    2/05/97 16:25:19
                                               Task Information                                 Page
                                                                                                  4

Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
Task ID    Job/Task Name                Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                    Start/End                                          Percent
-------------------------------------------------------------------------------------------------------------------
                                                      2                                                    1
       634 COOLPCF    COOL       070512     4      163   Y    Y            88053840              9955136     97.15
             C
       622 SMXCAGERO3                       1       32   Y    Y            88033984                45176      0.44
       621 SMXCAGERO2                       1       32   Y    Y            88033984                  112      0.00
       620 SMXCAGERO1                       1       32   Y    Y            88033976                13672      0.13
       615 PA-T-P23ARVYBC                   1       40   Y    Y            88033976                    0         0
       611 PA-T-P23ARWCME                   1       40   Y    Y            88033984                    0         0

   (Lines removed for brevity.)

             3
       166 SMSTRIPEWATCHDOG                 1       10   Y    Y            88003152                 1296      0.01
             C
       165 SMXCSPRVSR                       1       79   Y    Y            88003152                14928      0.15

   (Lines removed for brevity.)

         1 CFINT1                           0        0   Y    Y            88053848                96568      0.94
-------------------------------------------------------------------------------------------------------------------
                                                                                              10247176
```

Figure 18 (Part 4 of 14). STATS HIER Example - Program Called at Multiple Levels

```
                                          Performance Explorer Report                    2/05/97 16:25:19
                                         Stats CPU Summary Information                         Page
                                                                                                  8

Library . . . . . :  COOL
Member. . . . . :  COOLSHI
Description . . . :  STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
Partition . . . . :          2
Total CPU . . . . :      9955136    A
Task CPU. . . . . :            0     0.0 %
Job CPU . . . . . :      9955136   100.0 %
                  ----------------------
   Pgm/Mod CPU. . :      9945072    99.9 %
   Unknown CPU. . :        10064     0.1 %
```

Figure 18 (Part 5 of 14). STATS HIER Example - Program Called at Multiple Levels

```
                                        Performance Explorer Report                              2/05/97 16:25:19
                                          Statistics Information                                       Page    8
                                             Library Section
Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
                          +---------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX             CPU        DB    DB   NDB   NDB             CPU        DB    DB   NDB   NDB  Call
Name        Called    Made  Issued          (us) /   %    SIO   AIO   SIO   AIO          (us) /   %    SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
**LIC Task       0       0       0              0  0.0      0     0     0     0              0  0.0      0     0     0     0     0
**Unknown        0       0       0         10,064  0.1      0     0     0     0         10,064  0.1      0     0     0     0     0
QSYS           783     330    1352        146,552  1.5      0     0    20     0        948,008  9.5     48    64    96     0     0
MI CPLX       1366       0       0        517,464  5.2     41    64    29     0        517,464  5.2     41    64    29     0     0
PFREXP           8     447       3      9,281,056 93.2      0     7    15     0     19,645,896 ****     82   142    71     0     0
```

Figure 18 (Part 6 of 14). STATS HIER Example - Program Called at Multiple Levels

```
                                        Performance Explorer Report                              2/05/97 16:25:19
                                             Task Information                                        Page
                                                                                                        10
Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
Task ID    Job/Task Name                Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                     Start/End                                          Percent
-------------------------------------------------------------------------------------------------------------------------------
                                                  2
       634 COOLPCF    COOL       070512     4      163   Y    Y             88053840              9955136     100
-------------------------------------------------------------------------------------------------------------------------------
                                                                                                 9955136
```

Figure 18 (Part 7 of 14). STATS HIER Example - Program Called at Multiple Levels

Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX

				Inline Stats						Cumulative Stats						
Name	Times Called	Calls Made	MI CPLX Issued	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
**LIC Task	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	0	0	0
**Unknown	0	0	0	10,064	0.1	0	0	0	0	10,064	0.1	0	0	0	0	0
QMHSNDPM	1	0	7	328	0.0	0	0	0	0	1,040	0.0	0	0	0	0	1
*RSLVSP	2	0	0	360	0.0	0	0	0	0	360	0.0	0	0	0	0	2
*TESTAU	1	0	0	24	0.0	0	0	0	0	24	0.0	0	0	0	0	2
*FNDINXEN	1	0	0	120	0.0	0	0	0	0	120	0.0	0	0	0	0	2
*MATINVIF	2	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	2
*SNDPRMSG	1	0	0	128	0.0	0	0	0	0	128	0.0	0	0	0	0	2
*TESTEXCP	2	0	0	104	0.0	0	0	0	0	104	0.0	0	0	0	0	1
QMHRCVPM	2	2	14	760	0.0	0	0	0	0	18,360	0.2	0	0	2	0	1
*MATPRMSG	6	0	0	656	0.0	0	0	0	0	656	0.0	0	0	0	0	2
*MATINVIF	4	0	0	80	0.0	0	0	0	0	80	0.0	0	0	0	0	2
QMHGSD	2	20	14	1,880	0.0	0	0	0	0	16,584	0.2	0	0	2	0	2
*MATPRMSG	10	0	0	840	0.0	0	0	0	0	840	0.0	0	0	0	0	3
QUIVPMGR	8	0	0	544	0.0	0	0	0	0	544	0.0	0	0	0	0	3
QUILIST	10	0	1	896	0.0	0	0	0	0	984	0.0	0	0	0	0	3
*SETACST	1	0	0	88	0.0	0	0	0	0	88	0.0	0	0	0	0	4
*MODPRMSG	2	0	0	176	0.0	0	0	0	0	176	0.0	0	0	0	0	3
QUIMGFLW	2	14	0	1,080	0.0	0	0	0	0	11,880	0.1	0	0	2	0	3
QUIVPMGR	4	0	0	256	0.0	0	0	0	0	256	0.0	0	0	0	0	4
QUIICHK	4	0	0	384	0.0	0	0	0	0	384	0.0	0	0	0	0	4
QUIEXFMT	2	6	0	800	0.0	0	0	0	0	8,352	0.1	0	0	2	0	4
QMHRCVPM	2	0	14	576	0.0	0	0	0	0	1,104	0.0	0	0	0	0	5
*MATINVIF	6	0	0	200	0.0	0	0	0	0	200	0.0	0	0	0	0	6
*MATPTR	4	0	0	152	0.0	0	0	0	0	152	0.0	0	0	0	0	6
*MATPRMSG	4	0	0	152	0.0	0	0	0	0	152	0.0	0	0	0	0	6
QUIOCNV	2	0	0	1,080	0.0	0	0	0	0	1,080	0.0	0	0	0	0	5
QUIINMGR	2	4	0	1,496	0.0	0	0	0	0	5,360	0.1	0	0	2	0	5
QWSPUDDS	2	1	2	488	0.0	0	0	0	0	912	0.0	0	0	0	0	6
*MATPTR	2	0	0	72	0.0	0	0	0	0	72	0.0	0	0	0	0	7
QWSRST	1	1	2	136	0.0	0	0	0	0	344	0.0	0	0	0	0	7
QT3REQIO	1	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	8
*LOCK	1	0	0	88	0.0	0	0	0	0	88	0.0	0	0	0	0	8
*UNLOCK	1	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	8
QWSGET	2	2	2	792	0.0	0	0	0	0	2,952	0.0	0	0	2	0	6
*MATPTR	2	0	0	72	0.0	0	0	0	0	72	0.0	0	0	0	0	7
QT3REQIO	2	0	6	408	0.0	0	0	0	0	2,080	0.0	0	0	2	0	7
*REQIO	2	0	0	432	0.0	0	0	0	0	432	0.0	0	0	0	0	8
*MATPRATR	2	0	0	80	0.0	0	0	0	0	80	0.0	0	0	0	0	8
*DEQWAIT	2	0	0	1,152	0.0	0	0	2	0	1,152	0.0	0	0	2	0	8
QUIACT	2	2	0	432	0.0	0	0	0	0	1,312	0.0	0	0	0	0	4
QMHRMVPM	2	0	12	384	0.0	0	0	0	0	872	0.0	0	0	0	0	5

Figure 18 (Part 8 of 14). STATS HIER Example - Program Called at Multiple Levels

```
Library . . . : COOL
Member. . . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
                                  +----------------- Inline Stats ------------++------------- Cumulative Stats -----------+
             Times   Calls MI CPLX            CPU        DB    DB   NDB   NDB             CPU        DB    DB   NDB   NDB  Call
Name        Called    Made Issued          (us) /   %    SIO   AIO   SIO   AIO          (us) /   %    SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------

   (Lines removed for brevity.)
                 :
QDMCLOSE         2       2     10           456  0.0       0     0     0     0          5,264  0.1       0     0     0     0     2
*MATPRATR        2       0      0            72  0.0       0     0     0     0             72  0.0       0     0     0     0     3
*MATPTR          2       0      0            72  0.0       0     0     0     0             72  0.0       0     0     0     0     3
QWSCLOSE         2       2     14           648  0.0       0     0     0     0          3,536  0.0       0     0     0     0     3
*MATINVAT        2       0      0            64  0.0       0     0     0     0             64  0.0       0     0     0     0     4
*MATINVIF        2       0      0            40  0.0       0     0     0     0             40  0.0       0     0     0     0     4
*MATLUD          2       0      0           280  0.0       0     0     0     0            280  0.0       0     0     0     0     4
*MATSELLK        2       0      0           192  0.0       0     0     0     0            192  0.0       0     0     0     0     4
QT3REQIO         2       0      0            96  0.0       0     0     0     0             96  0.0       0     0     0     0     4
*MATPRATR        2       0      0            48  0.0       0     0     0     0             48  0.0       0     0     0     0     4
*DESS            4       0      0         2,144  0.0       0     0     0     0          2,144  0.0       0     0     0     0     4
*UNLOCK          2       0      0           128  0.0       0     0     0     0            128  0.0       0     0     0     0     3
*MODSOBJ         2       0      0            40  0.0       0     0     0     0             40  0.0       0     0     0     0     3
*DESS            2       0      0           936  0.0       0     0     0     0            936  0.0       0     0     0     0     3
*DESS            2       0      0           736  0.0       0     0     0     0            736  0.0       0     0     0     0     2
QMHRMVPM         2       0      8           264  0.0       0     0     0     0            544  0.0       0     0     0     0     2
*MATINVIF        4       0      0           112  0.0       0     0     0     0            112  0.0       0     0     0     0     3
*MATPTR          2       0      0            72  0.0       0     0     0     0             72  0.0       0     0     0     0     3
*MODPRMSG        2       0      0            88  0.0       0     0     0     0             88  0.0       0     0     0     0     3
QCATRS           2       0      5         1,032  0.0       0     0     2     0          2,712  0.0       0     0     4     0     1
*MODSOBJ         2       0      0            40  0.0       0     0     0     0             40  0.0       0     0     0     0     2
*RSLVSP          3       0      0         1,632  0.0       0     0     2     0          1,632  0.0       0     0     2     0     2
      4
CLCSTPEXHI       1      19      0         3,960  0.0       0     0     4     0      9,825,816 98.7      41    71    44     0     1
    CLCSTPEXHI/_CL_PEP
QCLRSLV          1       1     10         1,376  0.0       0     0     3     0          2,208  0.0       0     0     4     0     2
*MATINVAT        1       0      0            80  0.0       0     0     0     0             80  0.0       0     0     0     0     3
*MATPTRIF        1       0      0           376  0.0       0     0     1     0            376  0.0       0     0     1     0     3
QLIADOPT         1       0      1            32  0.0       0     0     0     0            104  0.0       0     0     0     0     3
*RSLVSP          1       0      0            64  0.0       0     0     0     0             64  0.0       0     0     0     0     4
*DEQ             5       0      0           168  0.0       0     0     0     0            168  0.0       0     0     0     0     3
*ENQ             3       0      0            80  0.0       0     0     0     0             80  0.0       0     0     0     0     3
QCADRV           3       9      3           744  0.0       0     0     0     0          3,808  0.0       0     0     1     0     2
*MATPTR          3       0      0           120  0.0       0     0     0     0            120  0.0       0     0     0     0     3
QCARULE          3       0      6           272  0.0       0     0     0     0          1,288  0.0       0     0     1     0     3
*RSLVSP          3       0      0           936  0.0       0     0     1     0            936  0.0       0     0     1     0     4
*TESTAU          3       0      0            72  0.0       0     0     0     0             72  0.0       0     0     0     0     4
QCAPOS           3       3      0           864  0.0       0     0     0     0          1,008  0.0       0     0     0     0     3
QCAFSCAN         3       0      0           136  0.0       0     0     0     0            136  0.0       0     0     0     0     4
QCAFLD           3       0      0           632  0.0       0     0     0     0            632  0.0       0     0     0     0     3
QCATRS           3       0      3           424  0.0       0     0     0     0            488  0.0       0     0     0     0     2
```

Figure 18 (Part 9 of 14). STATS HIER Example - Program Called at Multiple Levels

Library . . . : COOL
Member. . . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX

				+---------- Inline Stats ----------				++---------- Cumulative Stats ----------								
Name	Times Called	Calls Made	MI CPLX Issued	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
*MODSOBJ	3	0	0	56	0.0	0	0	0	0	56	0.0	0	0	0	0	3
QLICUSRL	1	1	7	304	0.0	0	0	0	0	2,944	0.0	0	0	3	0	2
*LOCKSL	1	0	0	56	0.0	0	0	0	0	56	0.0	0	0	0	0	3
*RSLVSP	1	0	0	616	0.0	0	0	1	0	616	0.0	0	0	1	0	3
*TESTAU	1	0	0	16	0.0	0	0	0	0	16	0.0	0	0	0	0	3
*MATSOBJ	1	0	0	88	0.0	0	0	0	0	88	0.0	0	0	0	0	3
*LOCK	1	0	0	72	0.0	0	0	0	0	72	0.0	0	0	0	0	3
*UNLOCKSL	1	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	3
*UNLOCK	1	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	3
QMHSNDPM	1	0	4	760	0.0	0	0	1	0	1,680	0.0	0	0	2	0	3
*FNDINXEN	1	0	0	472	0.0	0	0	1	0	472	0.0	0	0	1	0	4
*MATINVIF	2	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	4
*SNDPRMSG	1	0	0	376	0.0	0	0	0	0	376	0.0	0	0	0	0	4
QDMOVERD	2	1	2	232	0.0	0	0	0	0	776	0.0	0	0	0	0	2
*MATINVIF	2	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	3
QMHSNDPM	1	0	4	168	0.0	0	0	0	0	480	0.0	0	0	0	0	3
*FNDINXEN	1	0	0	144	0.0	0	0	0	0	144	0.0	0	0	0	0	4
*MATINVIF	2	0	0	48	0.0	0	0	0	0	48	0.0	0	0	0	0	4
*SNDPRMSG	1	0	0	112	0.0	0	0	0	0	112	0.0	0	0	0	0	4
QCLCLCPR	3	0	12	1,200	0.0	0	0	2	0	4,232	0.0	0	0	5	0	2
*RSLVSP	3	0	0	1,976	0.0	0	0	2	0	1,976	0.0	0	0	2	0	3
*MATSOBJ	3	0	0	784	0.0	0	0	1	0	784	0.0	0	0	1	0	3
*LOCKSL	3	0	0	144	0.0	0	0	0	0	144	0.0	0	0	0	0	3
*UNLOCKSL	3	0	0	104	0.0	0	0	0	0	104	0.0	0	0	0	0	3
5																
COMPTIMEE	2	19	0	3,120	0.0	0	0	4	0	9,632	0.1	0	0	6	0	2
COMPTIMEE/_CL_PEP																
QCLRSLV	2	2	16	1,392	0.0	0	0	2	0	2,208	0.0	0	0	2	0	3
*MATINVAT	2	0	0	176	0.0	0	0	0	0	176	0.0	0	0	0	0	4
*MATPTRIF	2	0	0	88	0.0	0	0	0	0	88	0.0	0	0	0	0	4
QLIADOPT	2	0	2	72	0.0	0	0	0	0	208	0.0	0	0	0	0	4
*RSLVSP	2	0	0	128	0.0	0	0	0	0	128	0.0	0	0	0	0	5
*DEQ	8	0	0	216	0.0	0	0	0	0	216	0.0	0	0	0	0	4
*ENQ	4	0	0	112	0.0	0	0	0	0	112	0.0	0	0	0	0	4

Figure 18 (Part 10 of 14). STATS HIER Example - Program Called at Multiple Levels

```
Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
```

Name	Times Called	Calls Made	MI CPLX Issued	Inline Stats CPU (us)	/ %	DB SIO	DB AIO	NDB SIO	NDB AIO	Cumulative Stats CPU (us)	/ %	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
QCADRV	2	6	2	520	0.0	0	0	0	0	1,896	0.0	0	0	0	0	3
*MATPTR	2	0	0	80	0.0	0	0	0	0	80	0.0	0	0	0	0	4
QCARULE	2	0	4	192	0.0	0	0	0	0	608	0.0	0	0	0	0	4
*RSLVSP	2	0	0	360	0.0	0	0	0	0	360	0.0	0	0	0	0	5
*TESTAU	2	0	0	48	0.0	0	0	0	0	48	0.0	0	0	0	0	5
QCAPOS	2	0	0	264	0.0	0	0	0	0	264	0.0	0	0	0	0	4
QCAFLD	2	0	0	408	0.0	0	0	0	0	408	0.0	0	0	0	0	4
QCATRS	2	0	2	168	0.0	0	0	0	0	216	0.0	0	0	0	0	3
*MODSOBJ	2	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	4
QWCSRTLR	2	2	0	184	0.0	0	0	0	0	360	0.0	0	0	0	0	3
QWCSCVTR	2	0	0	168	0.0	0	0	0	0	168	0.0	0	0	0	0	4
QCLCNVCN	5	0	10	360	0.0	0	0	0	0	832	0.0	0	0	0	0	3
*CVTEFN	5	0	0	288	0.0	0	0	0	0	288	0.0	0	0	0	0	4
*CVTCN,LB	5	0	0	168	0.0	0	0	0	0	168	0.0	0	0	0	0	4
QCLCNVNC	2	0	2	104	0.0	0	0	0	0	200	0.0	0	0	0	0	3
*CVTCN,LB	2	0	0	96	0.0	0	0	0	0	96	0.0	0	0	0	0	4
QCLRTNE	2	0	0	72	0.0	0	0	0	0	72	0.0	0	0	0	0	3
QCLCLNUP	2	0	8	304	0.0	0	0	0	0	696	0.0	0	0	0	0	3
*MATPTR	2	0	0	80	0.0	0	0	0	0	80	0.0	0	0	0	0	4
*MODS1	4	0	0	240	0.0	0	0	0	0	240	0.0	0	0	0	0	4
*ENQ	2	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	4
6																
CSTPEX	1	371	3	9,272,056	93.1	0	7	7	0	9,797,264	98.4	41	71	21	0	2
CSTPEX/_QRNP_PEP_CSTPEX																
*MATINVIF	1	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	3
QDMCOPEN	3	6	24	2,080	0.0	0	0	2	0	17,528	0.2	7	0	11	0	3
*MATINVIF	3	0	0	136	0.0	0	0	0	0	136	0.0	0	0	0	0	4
QDMGETOV	3	0	3	192	0.0	0	0	0	0	296	0.0	0	0	0	0	4
*MATINVIF	3	0	0	104	0.0	0	0	0	0	104	0.0	0	0	0	0	5
*RSLVSP	7	0	0	2,704	0.0	0	0	3	0	2,704	0.0	0	0	3	0	4
*MATPTR	3	0	0	112	0.0	0	0	0	0	112	0.0	0	0	0	0	4
*LOCK	4	0	0	984	0.0	0	0	2	0	984	0.0	0	0	2	0	4
*CRTDOBJ	3	0	0	2,528	0.0	0	0	0	0	2,528	0.0	0	0	0	0	4
*SETACST	3	0	0	280	0.0	0	0	0	0	280	0.0	0	0	0	0	4
*MNEVT	1	0	0	72	0.0	0	0	0	0	72	0.0	0	0	0	0	4
QWSOPEN	1	1	7	416	0.0	0	0	0	0	1,720	0.0	0	0	0	0	4
*MATINVAT	1	0	0	48	0.0	0	0	0	0	48	0.0	0	0	0	0	5
*MATINVIF	1	0	0	16	0.0	0	0	0	0	16	0.0	0	0	0	0	5
*MATLUD	1	0	0	112	0.0	0	0	0	0	112	0.0	0	0	0	0	5
*MODS1	1	0	0	480	0.0	0	0	0	0	480	0.0	0	0	0	0	5
*MATS	1	0	0	56	0.0	0	0	0	0	56	0.0	0	0	0	0	5
*CRTS	1	0	0	472	0.0	0	0	0	0	472	0.0	0	0	0	0	5

Figure 18 (Part 11 of 14). STATS HIER Example - Program Called at Multiple Levels

Library . . . : COOL
Member. . . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX

				+---------- Inline Stats ----------++---------- Cumulative Stats ----------+												
Name	Times Called	Calls Made	MI CPLX Issued	CPU (us)	/ %	DB SIO	DB AIO	NDB SIO	NDB AIO	CPU (us)	/ %	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
QWSDECFT	1	0	0	24	0.0	0	0	0	0	24	0.0	0	0	0	0	5
*MNEVT	1	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	5
QDBOPEN	2	0	6	488	0.0	0	0	0	0	6,560	0.1	7	0	4	0	4
*MATPTR	2	0	0	112	0.0	0	0	0	0	112	0.0	0	0	0	0	5
*CRTS	2	0	0	1,264	0.0	0	0	0	0	1,264	0.0	0	0	0	0	5
*ACTCR	2	0	0	4,688	0.0	7	0	4	0	4,688	0.0	7	0	4	0	5
*RSLVSP	1	0	0	416	0.0	0	0	0	0	416	0.0	0	0	0	0	3
7																
COMPTIMEE	4	38	0	1,920	0.0	0	0	0	0	13,184	0.1	0	0	0	0	3
COMPTIMEE/_CL_PEP																
QCLRSLV	4	4	32	1,344	0.0	0	0	0	0	2,984	0.0	0	0	0	0	4
*MATINVAT	4	0	0	360	0.0	0	0	0	0	360	0.0	0	0	0	0	5
*MATPTRIF	4	0	0	176	0.0	0	0	0	0	176	0.0	0	0	0	0	5
QLIADOPT	4	0	4	152	0.0	0	0	0	0	424	0.0	0	0	0	0	5
*RSLVSP	4	0	0	272	0.0	0	0	0	0	272	0.0	0	0	0	0	6
*DEQ	16	0	0	440	0.0	0	0	0	0	440	0.0	0	0	0	0	5
*ENQ	8	0	0	216	0.0	0	0	0	0	216	0.0	0	0	0	0	5
QCADRV	4	12	4	984	0.0	0	0	0	0	3,632	0.0	0	0	0	0	4
*MATPTR	4	0	0	152	0.0	0	0	0	0	152	0.0	0	0	0	0	5
QCARULE	4	0	8	376	0.0	0	0	0	0	1,200	0.0	0	0	0	0	5
*RSLVSP	4	0	0	712	0.0	0	0	0	0	712	0.0	0	0	0	0	6
*TESTAU	4	0	0	96	0.0	0	0	0	0	96	0.0	0	0	0	0	6
QCAPOS	4	0	0	496	0.0	0	0	0	0	496	0.0	0	0	0	0	5
QCAFLD	4	0	0	792	0.0	0	0	0	0	792	0.0	0	0	0	0	5
QCATRS	4	0	4	336	0.0	0	0	0	0	432	0.0	0	0	0	0	4
*MODSOBJ	4	0	0	96	0.0	0	0	0	0	96	0.0	0	0	0	0	5
QWCSRTLR	4	4	0	344	0.0	0	0	0	0	680	0.0	0	0	0	0	4
QWCSCVTR	4	0	0	336	0.0	0	0	0	0	336	0.0	0	0	0	0	5
QCLCNVCN	10	0	20	728	0.0	0	0	0	0	1,632	0.0	0	0	0	0	4
*CVTEFN	10	0	0	560	0.0	0	0	0	0	560	0.0	0	0	0	0	5
*CVTCN,LB	10	0	0	336	0.0	0	0	0	0	336	0.0	0	0	0	0	5
QCLCNVNC	4	0	4	200	0.0	0	0	0	0	392	0.0	0	0	0	0	4
*CVTCN,LB	4	0	0	192	0.0	0	0	0	0	192	0.0	0	0	0	0	5
QCLRTNE	4	0	0	144	0.0	0	0	0	0	144	0.0	0	0	0	0	4
QCLCLNUP	4	0	16	592	0.0	0	0	0	0	1,328	0.0	0	0	0	0	4
*MATPTR	4	0	0	136	0.0	0	0	0	0	136	0.0	0	0	0	0	5
*MODS1	8	0	0	464	0.0	0	0	0	0	464	0.0	0	0	0	0	5
*ENQ	4	0	0	128	0.0	0	0	0	0	128	0.0	0	0	0	0	5

Figure 18 (Part 12 of 14). STATS HIER Example - Program Called at Multiple Levels

Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX

				Inline Stats						Cumulative Stats						
Name	Times Called	Calls Made	MI CPLX Issued	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	CPU (us) /	%	DB SIO	DB AIO	NDB SIO	NDB AIO	Call Level
QDBGETM	358	0	716	46,408	0.5	0	0	1	0	482,056	4.8	31	63	1	0	3
*MATPTR	358	0	0	12,984	0.1	0	0	0	0	12,984	0.1	0	0	0	0	4
*RETSDSE	358	0	0	422,664	4.2	31	63	0	0	422,664	4.2	31	63	0	0	4
QDBGETKY	1	0	3	176	0.0	0	0	0	0	2,112	0.0	3	1	0	0	3
*MATPTR	1	0	0	32	0.0	0	0	0	0	32	0.0	0	0	0	0	4
*SETCR	1	0	0	1,832	0.0	3	1	0	0	1,832	0.0	3	1	0	0	4
*RETDSEN	1	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	4
QWSPUT	1	1	3	1,488	0.0	0	0	1	0	2,000	0.0	0	0	1	0	3
*MATPTR	1	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	4
*LOCK	1	0	0	96	0.0	0	0	0	0	96	0.0	0	0	0	0	4
*UNLOCK	1	0	0	48	0.0	0	0	0	0	48	0.0	0	0	0	0	4
QT3REQIO	1	0	1	112	0.0	0	0	0	0	312	0.0	0	0	0	0	4
*REQIO	1	0	0	192	0.0	0	0	0	0	192	0.0	0	0	0	0	5
QWSGET	1	1	2	520	0.0	0	0	0	0	1,696	0.0	0	0	0	0	3
*MATPTR	1	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	4
*DEQWAIT	1	0	0	400	0.0	0	0	0	0	400	0.0	0	0	0	0	4
QT3IOCMP	1	2	2	200	0.0	0	0	0	0	720	0.0	0	0	0	0	4
*RETEVTD	1	0	0	32	0.0	0	0	0	0	32	0.0	0	0	0	0	5
*DEQ	1	0	0	48	0.0	0	0	0	0	48	0.0	0	0	0	0	5
QT3REQIO	1	0	0	64	0.0	0	0	0	0	64	0.0	0	0	0	0	5
QWSMEEH	1	1	1	136	0.0	0	0	0	0	368	0.0	0	0	0	0	5
QWSGET	1	0	0	184	0.0	0	0	0	0	184	0.0	0	0	0	0	6
*ENQ	1	0	0	32	0.0	0	0	0	0	32	0.0	0	0	0	0	6
QDMCLOSE	3	3	19	768	0.0	0	0	0	0	6,104	0.1	0	0	1	0	3
*MATPRATR	3	0	0	104	0.0	0	0	0	0	104	0.0	0	0	0	0	4
*MATPTR	3	0	0	120	0.0	0	0	0	0	120	0.0	0	0	0	0	4
QWSCLOSE	1	2	5	312	0.0	0	0	0	0	1,264	0.0	0	0	0	0	4
*MATINVAT	1	0	0	40	0.0	0	0	0	0	40	0.0	0	0	0	0	5
*MATINVIF	1	0	0	24	0.0	0	0	0	0	24	0.0	0	0	0	0	5
*MATLUD	1	0	0	136	0.0	0	0	0	0	136	0.0	0	0	0	0	5
*MATSELLK	1	0	0	80	0.0	0	0	0	0	80	0.0	0	0	0	0	5
QT3REQIO	2	0	3	216	0.0	0	0	0	0	624	0.0	0	0	0	0	5
*REQIO	1	0	0	192	0.0	0	0	0	0	192	0.0	0	0	0	0	6

Figure 18 (Part 13 of 14). STATS HIER Example - Program Called at Multiple Levels

```
Library . . : COOL
Member. . . : COOLSHI
Description : STSHIER:CLCSTPEXHI,COMPTIMEE(2),CSTPEX
                                +---------------- Inline Stats ------------++------------- Cumulative Stats -----------+
             Times    Calls MI CPLX            CPU        DB    DB   NDB   NDB            CPU        DB    DB   NDB   NDB  Call
Name        Called     Made  Issued          (us) /   %   SIO   AIO   SIO   AIO         (us) /   %   SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
*MATPRATR        1        0       0             32  0.0     0     0     0     0           32  0.0     0     0     0     0     6
*DEQWAIT         1        0       0            176  0.0     0     0     0     0          176  0.0     0     0     0     0     6
*MATPRATR        1        0       0             24  0.0     0     0     0     0           24  0.0     0     0     0     0     5
*UNLOCK          3        0       0            184  0.0     0     0     0     0          184  0.0     0     0     0     0     4
*CANEVTMN        1        0       0            416  0.0     0     0     1     0          416  0.0     0     0     1     0     4
*DESS            4        0       0          1,672  0.0     0     0     0     0        1,672  0.0     0     0     0     0     4
*MODSOBJ         3        0       0             64  0.0     0     0     0     0           64  0.0     0     0     0     0     4
QDBCLOSE         2        0       0             64  0.0     0     0     0     0           64  0.0     0     0     0     0     4
*DESCR           2        0       0          1,408  0.0     0     0     0     0        1,408  0.0     0     0     0     0     4
*DEACTPG         1        0       0             32  0.0     0     0     0     0           32  0.0     0     0     0     0     3
QCLRTNE          1        0       0             32  0.0     0     0     0     0           32  0.0     0     0     0     0     2
QCLCLNUP         1        0       4            136  0.0     0     0     0     0          328  0.0     0     0     0     0     2
*MATPTR          1        0       0             32  0.0     0     0     0     0           32  0.0     0     0     0     0     3
*MODS1           2        0       0            120  0.0     0     0     0     0          120  0.0     0     0     0     0     3
*ENQ             1        0       0             24  0.0     0     0     0     0           24  0.0     0     0     0     0     3
QDMDELOV         1        0       1             72  0.0     0     0     0     0          112  0.0     0     0     0     0     2
*MATPRATR        1        0       0             32  0.0     0     0     0     0           32  0.0     0     0     0     0     3
*MATINVAT        1        0       0             48  0.0     0     0     0     0           48  0.0     0     0     0     0     1
*MATPTR          1        0       0             32  0.0     0     0     0     0           32  0.0     0     0     0     0     1
*INVP            3        0       0             80  0.0     0     0     0     0           80  0.0     0     0     0     0     1
QCMDEXC          2        8      12            856  0.0     0     0     0     0        5,880  0.1     0     0     0     0     1
*MATINVAT        4        0       0            160  0.0     0     0     0     0          160  0.0     0     0     0     0     2
*DEQ             2        0       0             88  0.0     0     0     0     0           88  0.0     0     0     0     0     2
QCADRV2          2       10       0            552  0.0     0     0     0     0        2,464  0.0     0     0     0     0     2
QCANPARS         2        0       0            384  0.0     0     0     0     0          384  0.0     0     0     0     0     3
QCARULE          2        0       4            168  0.0     0     0     0     0          592  0.0     0     0     0     0     3
*RSLVSP          2        0       0            368  0.0     0     0     0     0          368  0.0     0     0     0     0     4
*TESTAU          2        0       0             48  0.0     0     0     0     0           48  0.0     0     0     0     0     4
QCAPOS           2        0       0            312  0.0     0     0     0     0          312  0.0     0     0     0     0     3
QCAFLD           2        0       0            512  0.0     0     0     0     0          512  0.0     0     0     0     0     3
QCAIFLD          2        0       0             88  0.0     0     0     0     0           88  0.0     0     0     0     0     3
QCATRS           2        0       2            160  0.0     0     0     0     0          200  0.0     0     0     0     0     2
```

(Remaining lines removed for brevity.)

Figure 18 (Part 14 of 14). STATS HIER Example - Program Called at Multiple Levels

Notes for STATS HIER CMDCSTPEXH Example:

Because this is a STATS HIER example, we get values in the *Call Level* column on the report.

At **1**, you can see job COOLPCF/COOL/070512 was active 97.15% of the PEX collection run time. It is interesting to note that the PEX collection captured the RISC system Dynamic Priority Scheduler (DPS) having changed job 070512 RUNPTY value to 23 (**2** 163-140). This means the normal RUNPTY value of 20 was changed to 23 because the DPS detected that this job was taking too much CPU for a single transaction and lowered the job's run priority to 23. For the next transaction, the DPS resets the job's RUNPTY to 20 (160 in the PRTPEXRPT).

Note that we have kept LIC task SMSTRIPEWATCHDOG **3** and tasks SMXCSPRVSR, SMXCAGER01-SMXCAGER03 (**C**) in our snapshot of the Task section of our report example. When task SMSTRIPEWATCHDOG has consumed at least some CPU, it is an indication that at least a minimum of *disk mirroring* is active on the system. When task SMXCSPRVSR (Expert Cache supervisor) and SMXCAGERnn tasks (Expert Cache pool ager tasks, one per pool) have consumed at least some CPU, it is an indication that up to nn pools have been set to use expert cache. In our example environment we used the WRKSHRPOOL command to see

which shared storage pools were set to *CALC (expert cache active) and found pools *BASE, *INTERACT, and *SPOOL.

See *AS/400 Licensed Internal Code Diagnostics Aids*, LY44-4900, for more information on LIC task names.

4 ILE CL program CLCSTPEXHI and its PEP are shown running at call level 1 and cumulative CPU is the highest for any IBM function or application program during this data collection.

We collected this PEXT STATS HIER data after applying PTF MF14447. MF14447 removes an additional call level entry ***Alias** which may show up for ILE programs in the HIER reports. When *Alias is present, the call level counts for ILE programs are one number higher than you would expect.

If you do not have PTF MF14447 installed you see *Alias following each ILE program/PEP entry. With *Alias entries in the call level all programs/modules and MI Complex Instructions are *two* call levels below (higher number) the originating ILE program/PEP call level. In our example, OS/400 module QCLRSLV is at Call Level 2. If the PEX STATS HIER report showed an *Alias entry, OCLRSVL would have a Call Level of 3.

5 shows ILE CL program COMPTIMEE and its PEP at Call Level 2 when called from program CLCSTPEXHI. COMPTIMEE takes a moderate level of cumulative CPU and is called 2 times by CLCSTPEXHI.

6 shows ILE RPG program CSTPEX and its PEP at Call Level 2 when called from program CLCSTPEXHI.

At **7** we see COMPTIMEE and its PEP at Call Level 3 when called from CSTPEX. COMPTIMEE is called 4 times from CSTPEX.

This is the example of the same program being called at two different call levels - call level 2 at 5 (2 times) and call level 3 at 7 (4 times).

At **8** we can get an understanding of the database functions performed by program CSTPEX (call level 2) and its PEP. CSTPEX calls QDBGETM (call level 3) 358 times. QDBGETM calls *MATPTR (materialize pointer) 358 times and *RETSDSE (retrieve sequential data space entry) 358 times. *RETSDSE returns to CSTPEX, which promptly calls QDBGETKY for a random database read operation. QDBGETKY calls both *MATPTR and *SETCR (set cursor) to position to the record identified in a key field value. *RETDSEN (retrieve (non-sequential) data space entry) returns the record to the program (CSTPEX), which promptly does a workstation write (QWSPUT) to the interactive display device.

Remember, we did this PEX STATS HIER collection for a *single* work station transaction. Therefore, the high cumulative CPU time of 9.7 seconds shown at **6** and the relatively high number (358) of calls to QDBGETM for a single transaction alert us to some possible implementation problems with program CSTPEX.

In this simple example, we want to look further at program CSTPEX, so we run a PEX PROFILE collection against this program (and CLCSTPEXHI,

just in case) in Chapter 5, “Performance Explorer *PROFILE Option” on page 103.

At **A**, we see *Total CPU*, *Task CPU*, and *Job CPU* percentages. The absence of values for *Overhead Removed* and *Total Raw CPU* values demonstrate that PTF SF37834 has been applied on our system.

See Appendix D, “Performance Explorer PTF Summary” on page 489 for more information on PEX PTFs.

At **B**, we see the number of 4K pages in main storage. The number 131072 means main storage is 512 megabytes as calculated in the following figure:

1. 131,072 / 1024(1K) = 128
2. 128 * 4 = 512

4.6 PEX STATS Query Example

The query shown in Figure 19 on page 96 enables you to produce program level information similar to that shown in the PRTPEXRPT Statistics Information Section.

Since PRTPEXRPT STATS output from large, busy systems can be lengthy, this query may be used to subset the PEX STATS program-level statistics. Consider the following ways of reducing the report using query record select/omit criteria, remembering that each record in the selection represents both inline (direct) and cumulative program level statistics:

- Select only programs using more than a certain amount of CPU time
- Select only programs performing more than a certain amount of physical disk I/Os
- Select database access programs only (MI programs beginning with characters ″QDB″) to see the pattern and volume of database activity

An example of the output produced using the query definition shown in Figure 19 on page 96 is shown in Figure 20 on page 100.

```
5716QU1  V3R6M0  950929           IBM Query/400            SYSASM05  2/21/97    9:14:42        Page    1
  Query . . . . . . . . . . . . . . . . PEXQ01
    Library . . . . . . . . . . . . . . ITSOEX01
  Query text  . . . . . . . . . . . . . PEX STATS Stats Info
  Query CCSID . . . . . . . . . . . . .    37
  Query language id . . . . . . . . . . ENU
  Query country id  . . . . . . . . . . US
    *** . is the decimal separator character for this query ***
  Collating sequence  . . . . . . . . . Hexadecimal

  Processing options
    Use rounding  . . . . . . . . . . . Yes (default)
    Ignore decimal data errors  . . . . . No (default)
    Ignore substitution warnings  . . . . Yes
    Use collating for all compares  . . . Yes
  Special conditions
    *** All records selected by default ***

Selected files
  ID     File           Library       Member        Record Format
  T01    QAYPESTATS     ITSOEX01      FLAT          QYPESTATS
  T02    QAYPEMII       ITSOEX01      FLAT          QYPEMII
  T03    QAYPEMICPX     ITSOEX01      FLAT          QYPEMICPX
Join tests
  Type of join  . . . . . . . . . . . . . Matched records with primary file
  Field              Test              Field
  T01.QSTTBT         EQ                T02.QMITBT
  T01.QSTCMI         EQ                T03.QCPIDX
Result fields
  Name        Expression                          Column Heading          Len  Dec
  MIPGM       substr(t02.qmipnm,1,10)             Pgm
                                                  Name
                                                   M05
```

Figure 19 (Part 1 of 5). Example Query Definition PEX STATS Files

```
                                IBM Query/400                    2/21/97    9:14:42        Page    2
Result fields (continued)
  Name        Expression                        Column Heading          Len  Dec
  MICPGM      SUBSTR(T03.qcpsnm,1,10)           MI Complex
                                                Instr
                                                Name
  INSDB       T01.qiisdr+T01.qiisdw             Inline                   11    0
                                                DB
                                                SIO
  INADB       T01.QIIADR+T01.QIIADW             Inline                   11    0
                                                DB
                                                AIO
  INSNDB      T01.qiiwrt+T01.qiipwr+            Inline                   11    0
              T01.qiisnr+T01.qiisnw             NDB
                                                SIO
  INANDB      T01.qiianr+T01.qiianw             Inline                   11    0
                                                NDB
                                                AIO
  CUSDB       T01.QCISDR+T01.QCISDW             Cum                      11    0
                                                DB
                                                SIO
  CUADB       T01.QCIADR+T01.QCIADW             Cum                      11    0
                                                DB
                                                AIO
  CUSNDB      T01.QCIWRT+T01.QCIPWR+            Cum                      11    0
              T01.qcisnr+T01.qcisnw             NDB
                                                SIO
  CUANDB      T01.qcianr+T01.qcianw             Cum                      11    0
                                                NDB
                                                AIO
  INCPU       T01.qsticp/1000000                Inline                    7    3
                                                CPU
                                                Sec
  CUCPU       T01.qstccp/1000000                Cum                       7    3
                                                CPU
                                                Sec

Ordering of selected fields
  Field           Sort      Ascending/  Break  Field
  Name            Priority  Descending  Level  Text
  MIPGM
  MICPGM
  T01.QSTINV                                   Procedure invocation count
  T01.QSTCCT                                   Number of procedures called
  T01.QSTXCT                                   MI complex inst count
  INCPU
  INSDB
  INADB
  INSNDB
```

Figure 19 (Part 2 of 5). Example Query Definition PEX STATS Files

```
                                        MO5

                                IBM Query/400                    2/21/97    9:14:42        Page    3
Ordering of selected fields (continued)
  Field           Sort      Ascending/  Break  Field
  Name            Priority  Descending  Level  Text
  INANDB
  CUCPU
  CUSDB
  CUADB
  CUSNDB
  CUANDB
  TO1.QSTCLV                                Call level
Report column formatting and summary functions
  Summary functions:  1-Total, 2-Average, 3-Minimum, 4-Maximum, 5-Count          Overrides
  Field           Summary    Column                                 Dec  Null       Dec  Numeric
  Name            Functions  Spacing  Column Headings         Len  Pos  Cap   Len  Pos  Editing
  MIPGM                      0        Pgm                      10
                                      Name
  MICPGM                     0        MI CMPLX                 10
                                      Instr
                                      Name
  TO1.QSTINV                 0        Times                    20    0          5    0     Yes
                                      Called
  TO1.QSTCCT                 0        Calls                    20    0          5    0     Yes
                                      Made
  TO1.QSTXCT                 0        MI CMPLX                 20    0          5    0     Yes
                                      Inst
                                      Calls
  INCPU                      0        Inline                    7    3
                                      CPU
                                      Sec
  INSDB                      0        Inline                   11    0          7    0     Yes
                                      DB
                                      SIO
  INADB                      0        Inline                   11    0          7    0     Yes
                                      DB
                                      AIO
  INSNDB                     0        Inline                   11    0          7    0     Yes
                                      NDB
                                      SIO
  INANDB                     0        Inline                   11    0          7    0     Yes
                                      NDB
                                      AIO
  CUCPU                      0        Cum                       7    3
                                      CPU
                                      Sec
  CUSDB                      0        Cum                      11    0          7    0     Yes
                                      DB
                                      SIO
                                        MO5
```

Figure 19 (Part 3 of 5). Example Query Definition PEX STATS Files

```
                                IBM Query/400                    2/21/97    9:14:42         Page    4
Report column formatting and summary functions (continued)
  Summary functions:  1-Total, 2-Average, 3-Minimum, 4-Maximum, 5-Count          Overrides
  Field           Summary    Column                                   Dec  Null       Dec  Numeric
  Name            Functions  Spacing  Column Headings         Len  Pos  Cap   Len  Pos  Editing
  CUADB                      0        Cum                      11    0          7    0     Yes
                                      DB
                                      AIO
  CUSNDB                     0        Cum                      11    0          7    0     Yes
                                      NDB
                                      SIO
  CUANDB                     0        Cum                      11    0          7    0     Yes
                                      NDB
                                      AIO
  T01.QSTCLV                 2        Call                      9    0          3    0     Yes
                                      Lvl
Selected output attributes
  Output type . . . . . . . . . . . . . . Printer
  Form of output  . . . . . . . . . . . . Detail
  Line wrapping . . . . . . . . . . . . . No

Printer Output
  Printer device  . . . . . . . . . . . . *PRINT
  Report size
    Length  . . . . . . . . . . . . . . .  66 (default)
    Width . . . . . . . . . . . . . . . . 132
  Report start line . . . . . . . . . . .   6 (default)
  Report end line . . . . . . . . . . . .  60 (default)
  Report line spacing . . . . . . . . . . Single space
  Print definition  . . . . . . . . . . . No

Printer Spooled Output
  Spool the output  . . . . . . . . . . . (Defaults to value in print file, QPQUPRFIL)
  Form type . . . . . . . . . . . . . . . (Defaults to value in print file, QPQUPRFIL)
  Copies  . . . . . . . . . . . . . . . .   1
  Hold  . . . . . . . . . . . . . . . . . (Defaults to value in print file, QPQUPRFIL)


                                        M05
```

Figure 19 (Part 4 of 5). Example Query Definition PEX STATS Files

```
                                IBM Query/400                     2/21/97    9:14:42        Page    5
Cover Page
  Print cover page  . . . . . . . . . . . . Yes
    Cover page title
      Sample Query over PEX STATS Data

Page headings and footings
  Print standard page heading . . . . . . No
    Page heading
    Page footing

Database file output
  File  . . . . . . . . . . . . . . . . . QQRYOUT
    Library . . . . . . . . . . . . . . . ITSOPEX
  Member  . . . . . . . . . . . . . . . . *FILE
  Data in file  . . . . . . . . . . . . . New file
  For a new file:
    Authority . . . . . . . . . . . . . . *LIBCRTAUT
    Text about
      the file  . . . . . . . . . . . . . PEX STATS Stats Info - Part I of II
  Print definition  . . . . . . . . . . . No

Output file record format
  Output record length  . . . . . . . . .   159
  Output CCSID value  . . . . . . . . . .    37
  Field list:
    Field          Begin   Len  Dec   Null  Data Type           Text
    MIPGM              1    10              Character           substr(t02.qmipnm,1,10)
    MICPGM            11    10              Character           SUBSTR(t03.qcpsnm,1,10)
    QSTINV            21    20    0         Packed decimal      Procedure invocation count
    QSTCCT            32    20    0         Packed decimal      Number of procedures called
    QSTXCT            43    20    0         Packed decimal      MI complex inst count
    INCPU             54     7    3         Zoned decimal       t01.qsticp/1000000
    INSDB             61    11    0         Zoned decimal       t01.qiisdr+t01.qiisdw
    INADB             72    11    0         Zoned decimal       t01.QIIADR+T01.QIIADW
    INSNDB            83    11    0         Zoned decimal       t01.qiiwrt+t01.qiipwr+          t01.qiisnr+t01.qi
    INANDB            94    11    0         Zoned decimal       T01.qiianr+t01.qiianw
    CUCPU            105     7    3         Zoned decimal       t01.qstccp/1000000
    CUSDB            112    11    0         Zoned decimal       T01.QCISDR+T01.QCISDW
                                                 M05


                                IBM Query/400                     2/21/97    9:14:42        Page    6
Output file record format (continued)
  Field list:
    Field          Begin   Len  Dec   Null  Data Type           Text
    CUADB            123    11    0         Zoned decimal       T01.QCIADR+T01.QCIADW
    CUSNDB           134    11    0         Zoned decimal       T01.QCIWRT+T01.QCIPWR+          t01.qcisnr+t01.qc
    CUANDB           145    11    0         Zoned decimal       t01.qcianr+t01.qcianw
    QSTCLV           156     9    0         Binary              Call level
               * * * * *   E N D   O F   Q U E R Y   P R I N T   * * * * *
```

Figure 19 (Part 5 of 5). Example Query Definition PEX STATS Files

The output from this query is similar to the Statistics Information Section of the PRTPEXRPT for STATS data.

This query and sample report do not identify any specific problem. They are provided only as examples for obtaining fewer printed pages than a PRTPEXRPT report would produce.

```
                Sample Query over PEX STATS Data
          QUERY NAME . . . . . PEXQ01
          LIBRARY NAME . . . . ITSOEX01
          FILE         LIBRARY      MEMBER       FORMAT
          QAYPESTATS   ITSOEX01     FLAT         QYPESTATS
          QAYPEMII     ITSOEX01     FLAT         QYPEMII
          QAYPEMICPX   ITSOEX01     FLAT         QYPEMICPX
          DATE . . . . . . . . . 02/21/97
          TIME . . . . . . . . . 09:14:52
                       PEX STATS Stats Info
                    M05
```

Figure 20 (Part 1 of 2). Example Query Output using PEX STATS Data

```
Pgm       MI CMPLX  Times  Calls MI CMPLX   Inline  Inline  Inline  Inline  Inline      Cum     Cum     Cum     Cum     Cum   Call
Name      Instr     Called Made  Inst       CPU     DB      DB      NDB     NDB         CPU     DB      DB      NDB     NDB   Lvl
          Name                   Calls      Sec     SIO     AIO     SIO     AIO         Sec     SIO     AIO     SIO     AIO
          *CVTCN,LB   4138     0       0      .251       0       0       0       0      .251       0       0       0       0     0
QLICRLIB  --------       1    11      32      .003       0       0       2       0      .081       0       2     114       8     0
QWSOPEN   --------       1     1       6      .000       0       0       0       0      .001       0       0       0       0     0
          *CVTEFN      416     0       0      .022       0       0       0       0      .022       0       0       0       0     0
QMHSNDPM  --------      28     0     187      .014       0       0       1       0      .033       0       0       3       0     0
          *MATACTAT     28     0       0      .001       0       0       0       0      .001       0       0       0       0     0
QSQRXTRT  --------      27    81       0      .005       0       0       0       0      .082       0       0       6       0     0
          *MATAGPAT      2     0       0      .000       0       0       0       0      .000       0       0       0       0     0
          *REQIO         8     0       0      .002       0       0       0       0      .002       0       0       0       0     0
QTOASND   --------       7     0      14      .004       0       0       0       0      .005       0       0       0       0     0
QCLRTVDA  --------       1     1       3      .001       0       0       0       0      .003       0       0       0       0     0
          *MATLUD        3     0       0      .000       0       0       0       0      .000       0       0       0       0     0
          *DEACTCR       5     0       0      .001       0       0       0       0      .001       0       0       0       0     0
QTVSREAD  --------       7     0       0      .001       0       0       0       0      .001       0       0       0       0     0
          *DESCR        40     0       0      .026       0       0       0       0      .026       0       0       0       0     0
QQQISVSU  --------       5     5      10      .007       0       0       1       0      .013       0       0       1       0     0
QWPALLOC  --------       1     7       4      .001       0       0       0       0      .003       0       0       0       0     0
          *DESDSINX      6     0       0      .011      12       0      24       0      .011      12       0      24       0     0
QMHRMVPM  --------       9     0      40      .001       0       0       0       0      .003       0       0       0       0     0
          *INSDSEN      10     0       0      .018      16       9      48       0      .018      16       9      48       0     0
QMHMOVPM  --------      66     0     484      .013       0       0       0       0      .032       0       0       0       2     0
QCAPOS    --------      25     0       0      .006       0       0       0       0      .006       0       0       0       0     0
          *SETCR         6     0       0      .001       0       0       0       0      .001       0       0       0       0     0
QDBGETSQ  --------       4     0      12      .000       0       0       0       0      .001       0       0       0       0     0
          *FNDINXEN    639     0       0      .067       0       0       1       0      .067       0       0       1       0     0
QWSSPEND  --------       1     2       0      .000       0       0       0       0      .001       0       0       0       0     0
          *INSINXEN     11     0       0      .004       0       0       6       3      .004       0       0       6       3     0
QCMDEXC   --------      22   100     120      .011       0       0       0       0      .090       0       0       4       0     0
          *CRTINX        1     0       0      .002       0       0       9       1      .002       0       0       9       1     0
          *RMVINXEN      4     0       0      .001       0       0       0       1      .001       0       0       0       1     0
          *GRANT        14     0       0      .003       0       0      15       0      .003       0       0      15       0     0
QLIDLOBJ  --------       1     3       8      .001       0       0       0       0      .005       0       0       7       1     0
QCAIFLD   --------      19     0       0      .001       0       0       0       0      .001       0       0       0       0     0
          *CRTS        194     0       0      .229       0       0      48       0      .229       0       0      48       0     0
          *MODS1        84     0       0      .022       0       0       0       0      .022       0       0       0       0     0
          *ACTCR        52     0       0      .021       0       0       0       0      .021       0       0       0       0     0
          *MATSSATR     14     0       0      .001       0       0       0       0      .001       0       0       0       0     0
          *CRTCR        25     0       0      .202       0       0      66       1      .202       0       0      66       1     0
QSYGRAUT  --------       2     6      14      .001       0       0       0       0      .010       0       2       6       0     0
          *CRTCTX        1     0       0      .057       0       0      53       2      .057       0       0      53       2     0
          *RSLVSP      956     0       0      .123       0       0       0       0      .123       0       0       0       0     0
          *TESTAU      449     0       0      .010       0       0       0       0      .010       0       0       0       0     0
QMHPDEH   --------       9     0      27      .002       0       0       0       0      .006       0       0       0       0     0
QMHCHGEM  --------       4     0       8      .000       0       0       0       0      .001       0       0       0       0     0
QSQRTBLS  --------       2     0       1      .000       0       0       0       0      .000       0       0       0       0     0
QSQRAPLY  --------       4     0       0      .002       0       0       0       0      .002       0       0       0       0     0
          *RTNEXCP      26     0       0      .001       0       0       0       0      .001       0       0       0       0     0
          *MATINVAT     89     0       0      .004       0       0       0       0      .004       0       0       0       0     0
          *MATINVIF    819     0       0      .029       0       0       4       1      .029       0       0       4       1     0
QPTKYPRC  --------       2     0       0      .000       0       0       0       0      .000       0       0       0       0     0
          *CRTQ          1     0       0      .001       0       0       0       0      .001       0       0       0       0     0
                                                  MO5

(lines removed for brevity)
* * *  E N D  O F  R E P O R T  * * *
```

Figure 20 (Part 2 of 2). Example Query Output using PEX STATS Data

Chapter 5. Performance Explorer *PROFILE Option

The PEX PROFILE (ADDPEXDFN TYPE(*PROFILE)) option is used to localize CPU hot-spots within a program. To identify the hot-spots, we typically analyize either Performance Tools/400 Transaction (trace data collected) reports or a PRTPEXRPT of a PEX STATS definition collection. This analysis identifies one or more programs that need to be looked at in further detail.

5.1 How to use PEX *PROFILE

The following PEX command sequence to collect and print a PRTPEXRPT of PROFILE data is an example of some of the PROFILE options you may or may not want to use.

After this example we provide the exact commands used to define, collect, and report our actual program analysis example described in Section 5.2, “PEX PROFILE ILE Example” on page 105.

1. Add a PEX Definition (ADDPEXDFN).

 We recommend that you leave the INTERVAL default size at 1 millisecond.

 We define PEX PROFILE definition PROFILEALL to gather data for programs PGM01 and PGM02 in library APPLIB by entering the following command:

```
ADDPEXDFN DFN(PROFILEALL) TYPE(*PROFILE) JOB(*ALL)
          PGM((APPLIB/PGM01)(APPLIB/PGM02)) INTERVAL(1)
          TEXT('PROF: ALL JOBS, PGMS APPLIB:PGM01,PGM02')
```

 You can specify program names that do not exist; however, these programs must exist before you issue the STRPEX command or the STRPEX command will fail.

 Ensure that you use a meaningful name for DFN and meaningful characters for TEXT parameters.

2. Start a PEX Data Collection (STRPEX).

 We start collecting data using PEX definition PROFILEALL by entering:

```
STRPEX SSNID(PROFILEALL) OPTION(*NEW) DFN(PROFILEALL)
```

 While it is not necessary that the collection session (SSNID) name and the PEX definition (DFN) are the same, we recommended that you make them the same or keep the starting characters the same for ease of use.

 PEX support does not provide easy to use functions to *find a PEX definition* or *find a PEX data collection*. Minimizing the number of definitions and collections, and using easy to remember names is a requirement!

 To find all the PEX definitions you can do:

```
DSPFD FILE(QUSRSYS/QAPEXDFN) TYPE(*MBRLIST)
```

 To find all the PEX collection sessions, you need to understand what libraries the collected data has been stored in (specified on the ENDPEX command). QPEXDATA is the ENDPEX command DTALIB parameter default. Do a display file description TYPE(*MBRLIST) for at least one of the PEX data collection database files. For example:

```
DSPFD FILE(library-name/QAYPEBASE) TYPE(*MBRLIST)
```

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Note: We recommend that you use OPTION(*NEW) to ensure that a fresh collection is started.

3. End a PEX Data Collection (ENDPEX).

 As an example, to stop collection data for session PROFILEALL, enter:

   ```
   ENDPEX SSNID(PROFILEALL) OPTION(*END) DTAOPT(*LIB) DTALIB(QPEXDATA)
          DTAMBR(*SSNID) RPLDTA(*YES)
   ```

 Notes:

 a. We recommend that you use OPTION(*END).

 Suspend mode (OPTION(*SUSPEND)) can be used if you are measuring programs over a long period and want to avoid breaks, such as the lunch period. Avoid use of suspend mode until you are experienced with PEX.

 b. We recommend the use of RPLDTA(*YES) whenever the ENDPEX command is used. Replacing any previously collected data (RPLDTA(*YES)) that was stored with the *same DTAMBR(name)* ensures that the ENDPEX command will complete successfully.

 You may use the default collection storage library QPEXDATA. **However, we recommend using a specifically created library.** This makes deleting collections when no longer needed simply a matter of using the Delete Library (DLTLIB) command or Clear Library (CLRLIB) command, rather than remembering all the collection member names you have previously used and specifying them on the DLTPEXDTA command.

4. Print PEX Report for Collected Data (PRTPEXRPT).

 You print the report for PEX collection PROFILEALL by entering:

   ```
   PRTPEXRPT MBR(PROFILEALL) LIB(QPEXDATA) TYPE(*PROFILE)
   ```

Please refer to the PEX chapter in *Performance Tools/400*, SC41-4340, for details of PRTPEXRPT *PROFILE report headings and full details of the PEX commands.

5.1.1 PEX PROFILE Limitations

PEX PROFILE data collection has some limitations you should be aware of:

- The capability to specify generic program names (such as program ABC* in library ITSO12 or program *ALL in library ITSOMLIB) is deliberately not provided with PEX PROFILE, because the maximum number of programs that can be specified in a PEX PROFILE definition is 16.
- When an OPM program is included in a PEX PROFILE collection, the HLL statement numbers that appear in the PRTPEXRPT *PROFILE report **are not the actual HLL source code statement numbers.**

 You can determine the actual source code statement number by doing the following steps:

 1. Compile the OPM program with an *LIST generation option.

 This listing includes the original HLL source statement number (the number you want to find) and the corresponding MI instructions generated for this HLL statement. These MI instructions are assigned their own INSTruction number on the listing.

 2. Collect PEX PROFILE data that includes the OPM program.
 3. PRTPEXRPT TYPE(*PROFILE) PROFILEOPT(*SAMPLECOUNT *STATEMENT)

4. Find the OPM program highest count statement number (in decimal) and convert to its corresponding hexadecimal value.

 For example, decimal 241 is hexadecimal F1 ((15 * 16) + 1).

5. Scan the MI statement portion of the listing (Generate Output section) obtained in 1 to find that hexadecimal instruction number under the column heading *INST*. On the right side of that same print line you also have the HLL source statement number under the *Break* column heading. Two lines preceding the matched *INST* line you also see **BRK ′HLL source statement number′**.

6. Find that statement number in your original source portion of the listing.

 We provide an example of this conversion in Section 5.3, “PEX PROFILE OPM Example” on page 112.

5.2 PEX PROFILE ILE Example

This PEX PROFILE example uses the same programs CLCSTPEXHI and CSTPEX that were used in Section 4.5, “PEX STATS HIER Example - Program at Multiple Levels” on page 83. The following PEX PROFILE definition, PEX collection run, and PRTPEXRPT commands were used:

```
ADDPEXDFN DFN(RBPROF2PGM) TYPE(*PROFILE) JOB(*ALL)
          PGM((PFREXP/CLCSTPEXHI)(PFREXP/CSTPEX)) INTERVAL(1)
          TEXT('RBPROF CLCSTPEXHI, CSTPEX')

STRPEX SSNID(RBPROF2PGM) OPTION(*NEW) DFN(RBPROF2PGM)

ENDPEX SSNID(RBPROF2PGM) OPTION(*END) DTAOPT(*LIB) DTALIB(COOL)
       DTAMBR(*SSNID) RPLDTA(*YES)
       TEXT('RBPROF-CMDCSTPEXH (CLCSTPEXHI, CSTPEX)')

PRTPEXRPT MBR(RBPROF2PGM) LIB(COOL) TYPE(*PROFILE)
          PROFILEOPT(*SAMPLECOUNT *STATEMENT)
```

The following figures show PRTPEXRPT PROFILE report output and a compiler listing of program CSTPEX.

```
                          Performance Explorer Report                    1/21/97 13:39:10
                            Definition Information                             Page
                                                                                  1
Library . . : COOL
Member. . . : RBPROF2PGM
Description : RBPROF-CMDCSTPEXH (CLCSTPEXHI, CSTPEX)
Type . . . . . . . . . . . . : PROFILE
Definition Name. . . . . . . : RBPROF2PGM
Defined By . . . . . . . . . : COOL
Definition Description . . . : RBPROF CLCSTPEXH, CSTPEX
Include Dependent Jobs . . . : YES
Sample Interval (ms) . . . . : 1
Selected Jobs:
    Name       User       Number
    *ALL       *ALL       *ALL
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
Selected Programs:
    Pane Size  Library    Program    Type       Module     Procedure
    4          PFREXP     CLCSTPEXHI *PGM       *ALL       *ALL
    4          PFREXP     CSTPEX     *PGM       *ALL       *ALL
```

Figure 21 (Part 1 of 6). PRTPEXRPT Profile Example for CLCSTPEXHI, CSTPEX (ILE)

```
Library . . : COOL
Member. . . : RBPROF2PGM
Description : RBPROF-CMDCSTPEXH (CLCSTPEXHI, CSTPEX)
Sessions since IPL. . . . . :                      17
Session name. . . . . : RBPROF2PGM
Start time. . . . . : 1997-01-21-13.36.35.475064
Stop time . . . . . : 1997-01-21-13.38.10.890248
Total time  DD-HH.MM.ss.uuuuuu. . . . . :        00-00.01.35.415184
Suspend time (us) . . . . . :                  342,296
Number of events. . . . . :                      2,506
Trace wrap count. . . . . :                          0
Job creating session. . . . . : QPADEV0006COOL     068399
Started by user . . . . . : COOL
Target system . . . . . : ITSOM05
Serial number . . . . . : 10-16CAD
System type . . . . . : 9406
System model. . . . . : 510
Total pages memory. . . . . :                    98,304
OS/400 level. . . . . : 50N
Version . . . . . : V3R6M0
Configured ASPs . . . . . :                          1
Logical DASDs . . . . . :                            7
Data areas. . . . . :                                1
Jobs/tasks in session . . . . . :                  288
Jobs in session . . . . . :                        118
```

Figure 21 (Part 2 of 6). PRTPEXRPT Profile Example for CLCSTPEXHI, CSTPEX (ILE)


```
Library . . . . :  COOL
Member. . . . . :  RBPROF2PGM
Description . . :  RBPROF-CMDCSTPEXH (CLCSTPEXHI, CSTPEX)
Total CPU . . . :       8480864
Job CPU . . . . :       8256856    97.4 %
Task CPU. . . . :        224008     2.6 %
                -----------------------
Total Samples . :          7664
Total Hits. . . :          1108    14.5 %
```

Figure 21 (Part 3 of 6). PRTPEXRPT Profile Example for CLCSTPEXHI, CSTPEX (ILE)


```
                                        Library Section
Library . . : COOK
Member. . . : RBPROF2PGM
Description : RBPROF-CMDCSTPEXH (CLCSTPEXHI, CSTPEX)
                         Histogram     Hit   Hit   Cum   Start             Map    Stmt   Name
                                       Cnt    %     %    Addr              Flag   Numb
-------------------------------------------------------------------------------------------------------------------------
**********************************     1108 100.0 100.0 22B55B7DFD002360   MP         7  PFREXP
```

Figure 21 (Part 4 of 6). PRTPEXRPT Profile Example for CLCSTPEXHI, CSTPEX (ILE)

```
                                        Performance Explorer Report                          1/21/97 13:39:10
                                             Task Information                                       Page
                                                                                                      5
Library . . : COOK
Member. . . : RBPROF2PGM
Description : RBPROF-CMDCSTPEXH (CLCSTPEXHI, CSTPEX)
Task ID    Job/Task Name               Pool Priority Existence    Elapsed Time (us)       Run Time (us) Run Time
                                              Start/End                                              Percent
-------------------------------------------------------------------------------------------------------------
      2228 QPADEV0006 COOK       068399     4      160   Y    Y            93112512             7856616     92.64
      2227 QPADEV0004 TEAM96     068398     4      160   Y    Y            93083944                   0         0
      2007 QPADEV0009 SAKAI      068394     4      160   Y    Y            93064560                   0         0
      2006 QPADEV0021 COOK       068393     4      160   Y    Y            93064560                   0         0
      2003 T2-P23NPTT7                      1       75   Y    Y            93064568                   0         0
      1857 P23ARVYBC  AS0219R    068381     4      160   Y    Y            93032152                   0         0
      1854 QZDASOINIT QUSER      068378     2      160   Y    Y            93032152                   0         0
      1842 QZSCSRVS   QUSER      068366     2      160   Y    Y            93002440                   0         0

  (Remaining task information omitted for brevity.)
```

Figure 21 (Part 5 of 6). PRTPEXRPT Profile Example for CLCSTPEXHI, CSTPEX (ILE)

```
                                        Performance Explorer Report                          1/21/97 13:39:10
                                             Profile Information                                    Page   12
Library . . : COOK
Member. . . : RBPROF2PGM
Description : RBPROF-CMDCSTPEXH (CLCSTPEXHI, CSTPEX)
                          Histogram     Hit   Hit   Cum   Start            Map    Stmt   Name
                                        Cnt    %     %    Addr             Flag   Numb
-------------------------------------------------------------------------------------------------------------
                        **********       349  31.5  31.5 22B55B7DFD002E48  MP       45  CSTPEX  1
                           *******       243  21.9  53.4 22B55B7DFD002DA0  MP       42  CSTPEX  2
                            ******       202  18.2  71.7 22B55B7DFD003E40  MP      106  CSTPEX  3
                                **        82   7.4  79.1 22B55B7DFD002F20  MP       46  CSTPEX
                                **        81   7.3  86.4 22B55B7DFD002D6C  MP       41  CSTPEX
                                 *        53   4.8  91.2 22B55B7DFD003ECC  MP      107  CSTPEX
                                 *        45   4.1  95.2 22B55B7DFD002E2C  MP       44  CSTPEX
                                          15   1.4  96.6 22B55B7DFD002F90  MP       47  CSTPEX
                                          10   0.9  97.5 22B55B7DFD003E38  MP      105  CSTPEX
                                           7   0.6  98.1 22B55B7DFD002FA0  MP       50  CSTPEX
                                           4   0.4  98.5 22B55B7DFD002360  MP        7  CSTPEX
                                           4   0.4  98.8 22B55B7DFD002500  MP       14  CSTPEX
                                           2   0.2  99.0 22B55B7DFD0023F4  MP       10  CSTPEX
                                           2   0.2  99.2 22B55B7DFD002D48  MP       40  CSTPEX
                                           2   0.2  99.4 22B55B7DFD003100  MP       55  CSTPEX
                                           2   0.2  99.5 22B55B7DFD003288  MP       69  CSTPEX
                                           2   0.2  99.7 22B55B7DFD00454C  MP      128  CSTPEX
                                           1   0.1  99.8 3567AA401D0024B8  MP     5400  CLCSTPEXHI  4
                                           1   0.1  99.9 22B55B7DFD0024B0  MP       13  CSTPEX
                                           1   0.1 100.0 22B55B7DFD002CC0  MP       38  CSTPEX
```

Figure 21 (Part 6 of 6). PRTPEXRPT Profile Example for CLCSTPEXHI, CSTPEX (ILE)

Notes for STATS PROFILE CSTPEX Program Example:

The sequence of asterisk (*****) characters under the *Histogram* column visually indicate the relative frequency of instruction hits during the PROFILE collection. The more hits, the more CPU resource the instruction consumed.

1 Statement number 45 consumed 31.5% of all statement hits during the collection. This is the highest hit percentage. See **1L** in Figure 22 on page 108 to determine that this is a divide function.

2 Statement number 42 consumed 21.9% of all statement hits during the collection. This is the second highest hit percentage. See **2L** in Figure 22 on page 108 to determine that this is a multiply function.

3 Statement number 106 consumed 18.2% of all statement hits during the collection. This is the third highest hit percentage. See **3L** in Figure 22 on page 108 to determine that this is a multiply function.

At **4**, we see that a statement (5400) from program CLCSTPEXHI was recorded. This is shown just for illustration purposes when more than one program is collected under PEX PROFILE. Statement 5400 has such a low hit percentage (0.1) that investigating program CLCSTPEXHI is not worth the effort.

In our simple program example, you can see that three statements were responsible for 71.75 of all hits. Investigating other statements does not seem to be worthwhile.

In a real application program, you may find the PEX PROFILE Profile Information showing high percentage hits for a single statement or similar percentages for multiple statements. You need to look at the program source code to determine if the high CPU cost is really because of a single statement or groups of statements, such as a processing loop of some kind.

You may conclude that a new algorithm should be written, a different HLL language may be more efficient for the function you want to perform, or the function is doing what it has to do as fast as it can and *no programming change* should be made!

```
5716RG1 V3R6M0  950929 RN        IBM ILE RPG/400         PFREXP/CSTPEX            RCHASM05   01/21/97 13:35:23        Page      1
 Command  . . . . . . . . . . . :   CRTBNDRPG
   Issued by  . . . . . . . . . :     COOL
 Program  . . . . . . . . . . . :   CSTPEX
   Library  . . . . . . . . . . :     PFREXP
 Text 'description' . . . . . . :   *SRCMBRTXT
 Source Member  . . . . . . . . :   CSTPEX
 Source File  . . . . . . . . . :   QRPGLESRC
   Library  . . . . . . . . . . :     PFREXP
   CCSID  . . . . . . . . . . . :     37
 Text 'description' . . . . . . :   ILE RPG READ CSTFIL/CHAIN ITMFIL for Perf Exp lan
 Last Change  . . . . . . . . . :   01/21/97  13:35:18
 Generation severity level  . . :   10
 Default activation group . . . :   *YES
 Compiler options . . . . . . . :   *XREF      *GEN       *NOSECLVL  *SHOWCPY
                                    *EXPDDS    *EXT       *NOEVENT
 Debugging views  . . . . . . . :   *STMT
 Output . . . . . . . . . . . . :   *PRINT
 Optimization level . . . . . . :   *NONE
 Source listing indentation . . :   *NONE
 Type conversion options  . . . :   *NONE
 Sort sequence  . . . . . . . . :   *HEX
 Language identifier  . . . . . :   *JOBRUN
 Replace program  . . . . . . . :   *YES
 User profile . . . . . . . . . :   *USER
 Authority  . . . . . . . . . . :   *LIBCRTAUT
 Truncate numeric . . . . . . . :   *YES
 Fix numeric  . . . . . . . . . :   *NONE
 Target release . . . . . . . . :   *CURRENT
 Allow null values  . . . . . . :   *NO
```

Figure 22 (Part 1 of 5). CSTPEX Program Compiled Source Statement Numbers (ILE)

```
 5716RG1 V3R6M0  950929 RN        IBM ILE RPG/400         PFREXP/CSTPEX            RCHASM05   01/21/97 13:35:23       Page      2
Line   <---------------------- Source Specifications ---------------------------><---- Comments ----> Do  Page  Change Src Seq
Number ....1....+....2....+....3....+....4....+....5....+....6....+....7....+....8....+....9....+...10 Num Line  Date   Id  Number
                        S o u r c e   L i s t i n g
     1 H DFTNAME(ITMINL)                                                                                          000000     000100
     2 F*CUSTOMER FILE READ PROGRAM FOR PERFORMANCE TEST                                                          920615     000200
     3 F*                                                                                                         000000     000300
     4 FCSTFIL    IF   E           K DISK    BLOCK(*YES)                          V3R6 BLOCK kwd                 950824     000400
       *-------------------------------------------------------------------------------------------------*
       *                              RPG name         External name                                     *
       * File name. . . . . . . . . :  CSTFIL          PFREXP/CSTFIL                                     *
       * Record format(s) . . . . . :  CSTREC          CSTREC                                            *
       *-------------------------------------------------------------------------------------------------*
     5 FITMFIL    IF   E           K DISK                                                                       950815     000500
       *-------------------------------------------------------------------------------------------------*
       *                              RPG name         External name                                     *
       * File name. . . . . . . . . :  ITMFIL          PFREXP/ITMFIL                                     *
       * Record format(s) . . . . . :  ITMREC          ITMREC                                            *
       *-------------------------------------------------------------------------------------------------*
     6 FBUPAP1ID  CF   E             WORKSTN                                                                    950815     000600
       *-------------------------------------------------------------------------------------------------*
       *                              RPG name         External name                                     *
       * File name. . . . . . . . . :  BUPAP1ID        PFREXP/BUPAP1ID                                   *
       * Record format(s) . . . . . :  PROMPT          PROMPT                                            *
       *-------------------------------------------------------------------------------------------------*
     7=ICSTREC                                                                                                                1000001
       *-------------------------------------------------------------------------------------------------*                    1
       * RPG record format  . . . . :  CSTREC                                                           *                    1
       * External format  . . . . . :  CSTREC : PFREXP/CSTFIL                                           *                    1
       *-------------------------------------------------------------------------------------------------*                    1
     8=I                             S    1    6 OCNUM                          CUSTOMER NUMBER                        1000002
     9=I                             A    7   26  CNAME                         CUSTOMER NAME                          1000003
    10=I                             A   27   66  ADRES1                        ADDRESS FIELD     1                    1000004
    11=I                             A   67  106  ADRES2                        ADDRESS FIELD     2                    1000005
    12=I                             A  107  107  STATUS                        STATUS FIELD                           1000006
    13=I                             S  108  119 OTIMSTC                         TIME STAMP FIELD                       1000007
    14=I                             A  120  269  CSTWKA                        CST WORK AREA                          1000008
    15=IITMREC                                                                                                               2000001
```

Figure 22 (Part 2 of 5). CSTPEX Program Compiled Source Statement Numbers (ILE)

```
      *------------------------------------------------------------------------------------------*                    2
      * RPG record format  . . . . :  ITMREC                                                    *                    2
      * External format  . . . . . :  ITMREC : PFREXP/ITMFIL                                    *                    2
      *------------------------------------------------------------------------------------------*                    2
    16=I                            A    1    2  ITMID                          ITEM ID FLD                        2000002
    17=I                            S    3    8 OINUM                          ITEM NUMBER                        2000003
    18=I                            A    9   23  IDESC                         ITEM DESCRIPTION                   2000004
    19=I                            S   24   28 2IPRICE                        ITEM PRICE                         2000005
    20=I                            S   29   33 OONHAND                        ON HAND                            2000006
    21=I                            A   34   34  IDELET                        ITEM DELETE CODE                   2000007
    22=I                            S   35   46 OTIMSTI                        TIME STAMP FIELD                   2000008
    23=I                            A   47  196  ITMWKA                        ITEM WORK AREA                     2000009
    24=IPROMPT                                                                                                     3000001
      *------------------------------------------------------------------------------------------*                    3
      * RPG record format  . . . . :  PROMPT                                                    *                    3
                                      MO5
 5716RG1 V3R6M0  950929 RN        IBM ILE RPG/400         PFREXP/CSTPEX            RCHASM05   01/21/97 13:35:23        Page      3
Line   <---------------------- Source Specifications ---------------------------><---- Comments ----> Do  Page  Change Src Seq
Number ....1....+....2....+....3....+....4....+....5....+....6....+....7....+....8....+....9....+...10 Num Line  Date   Id  Number
      * External format  . . . . . :  PROMPT : PFREXP/BUPAP1ID                                  *                    3
      * Format text  . . . . . . . :  ITEM PROMPT FORMAT                                       *                    3
      *------------------------------------------------------------------------------------------*                    3
    25=I                            A    1    1  *IN01                          END PROGRAM                        3000002
    26=I                            S    2    7 OCNUM                          CUSTOMER NUMBER                    3000003
    27=I                            S    8   13 OINUM                          ITEM NUMBER                        3000004
    28 C     *ENTRY        PLIST                                                                                  000000     000700
    29 C                   PARM                    MAXRCD          15 5                                           920609     000800
    30 C                   PARM                    CPULUP          15 5                                           940729     000900
    31 C                   PARM                    CMPCNM          15 5                                           950814     001000
    32 C                   PARM                    STOP             1                                             950814     001100
    33 C                   Z-ADD     1             CTR              6 0                                           000000     001200
    34 C                   MOVE      '1'           INOUT                                                          950815     001300
    35 C                   CALL      'COMPTIMEE'                                                                  970121     001400
    36 C                   PARM                    TIMEC            6                                             950815     001500
    37 C                   PARM                    INOUT            1                                             950815     001600
    38 C     CTR           DOWLE     MAXRCD                                                        B01            000000     001700
    39 C* DO TO CONSUME CPU                                                                                      * 940204     001800
    40 C                   Z-ADD     CPULUP        CPUCTR          15 5                             01            940729     001900
    41 C     CPUCTR        DOWGE     1                                                              B02            940204     002000
    2L
    42 C     MAXRCD        MULT      CPUCTR        LUPVAL          15 5                             02            940204     002100
    43 C* Do MULT in other area of program as well                                                               970121     002200
    44 C                   EXSR      MULT                                                           02            970121     002300
    1L
    45 C     LUPVAL        DIV       CPUCTR        LUPVAL                                           02            940204     002400
    46 C     CPUCTR        SUB       1             CPUCTR                                           02            940204     002500
    47 C                   END                                                                    E02            940204     002600
    48 C* END CONSUME CPU                                                                                        * 940204     002700
    49 C*** CHANGED TO READ CSTREC                                                                               950814     002800
    50 C                   READ      CSTREC                    ----31                               01            950814     002900
    51 C     *IN31         IFEQ      '1'                                                            B02            950814     003000
    52 C                   GOTO      WTDSP                                                          02            950814     003100
    53 C                   END                                                                    E02            950815     003200
```

Figure 22 (Part 3 of 5). CSTPEX Program Compiled Source Statement Numbers (ILE)

```
    54 C*********************************************************                                  950814     003300
    55 C     CMPCNM        IFEQ      CNUM                                                  B02   950814     003400
    56 C                   MOVE      CSTWKA        CWKA           150                      02    950814     003500
    57 C                   MOVE      CNAME         CNAMA           20                      02    950814     003600
    58 C                   MOVE      CNUM          CNUMA            6 0                    02    950814     003700
    59 C                   MOVE      ADRES1        ADRS1A          40                      02    950814     003800
    60 C                   MOVE      ADRES2        ADRS2A          40                      02    950814     003900
    61 C     STOP          IFEQ      'Y'                                                   B03   950814     004000
    62 C                   GOTO      WTDSP                                                 03    950814     004100
    63 C                   END                                                             E03   950814     004200
    64 C                   ELSE                                                            X02   950814     004300
    65 C********                                                                                950815     004400
    66 C                   Z-ADD     1             CTRDMY           6 0                    02    950815     004500
    67 C********                                                                                950815     004600
    68 C                   END                                                             E02   950814     004700
    69 C     CTR           ADD       1             CTR                                    01    950815     004800
    70 C                   END                                                             E01   950815     004900
    71 C     WTDSP         TAG                                                                 950814     005000
    72 C                   MOVE      '2'           INOUT                                       950815     005100
    73 C                   CALL      'COMPTIMEE'                                               970121     005200
    74 C                   PARM                    TIMEC            6                          950815     005300
    75 C                   PARM                    INOUT            1                          950815     005400
                                                   MO5
 5716RG1 V3R6M0  950929 RN        IBM ILE RPG/400         PFREXP/CSTPEX            RCHASM05   01/21/97 13:35:23       Page      4
Line   <---------------------- Source Specifications ---------------------------><---- Comments ----> Do  Page  Change Src Seq
Number ....1....+....2....+....3....+....4....+....5....+....6....+....7....+....8....+....9....+...10 Num Line  Date   Id  Number
    76 C******                                                                                  950815     005500
    77 C******  IF CUST NUMBER FIELD CNUM EQUAL CSTNBR DISPLAY SAVED FIELDS                      950815     005600
    78 C******  OTHERWISE USE LAST FIELDS LAST READ FROM CSTFIL - END OF FILE                    950815     005700
    79 C******  OR MAXRCD REACHED.                                                              950815     005800
    80 C*****                                                                                   950815     005900
    81 C     *IN31         IFNE      '1'                                                   B01   950815     006000
    82 C     MAXRCD        ORNE      CTR                                                    01    950815     006100
    83 C                   MOVE      CWKA          CSTWKA                                   01    950814     006200
    84 C                   MOVE      CNAMA         CNAME                                    01    950814     006300
    85 C                   MOVE      CNUMA         CNUM                                     01    950814     006400
    86 C                   MOVE      ADRS1A        ADRES1                                   01    950814     006500
    87 C                   MOVE      ADRS2A        ADRES2                                   01    950814     006600
    88 C                   END                                                             E01   950815     006700
    89 C                   Z-ADD     CMPCNM        INUM                                        950815     006800
    90 C*****************************************                                               950815     006900
    91 C*****************************************                                               950815     007000
    92 C                   MOVE      '1'           INOUT                                       950815     007100
    93 C                   CALL      'COMPTIMEE'                                               970121     007200
    94 C                   PARM                    TIMEI            6                          950815     007300
    95 C                   PARM                    INOUT            1                          950815     007400
    96 C     INUM          CHAIN     ITMFIL                             44----                  950815     007500
    97 C                   MOVE      '2'           INOUT                                       950815     007600
    98 C                   CALL      'COMPTIMEE'                                               970121     007700
    99 C                   PARM                    TIMEI            6                          950815     007800
   100 C                   PARM                    INOUT            1                          950815     007900
   101 C                   WRITE     PROMPT                                                    950814     008000
   102 C                   READ      BUPAP1ID                           ----97                 950815     008100
```

Figure 22 (Part 4 of 5). CSTPEX Program Compiled Source Statement Numbers (ILE)

```
   103 C                   SETON                                        LR----                                  950815     008200
   104 C                   RETURN                                                                               000000     008300
   105 C     MULT          BEGSR                                                    MULT HERE TOO               970121     008400
     3L
   106 C     MAXRCD        MULT      CPUCTR        LUPVAL           15 5                                        970121     008500
   107 C                   ENDSR                                                    Return to Caller            970121     008600
   108=OPROMPT                                                                                                           4000001
        *---------------------------------------------------------------------------------------------*                    4
        * RPG record format  . . . . :  PROMPT                                                       *                    4
        * External format  . . . . . :  PROMPT : PFREXP/BUPAP1ID                                     *                    4
        * Format text  . . . . . . . :  ITEM PROMPT FORMAT                                           *                    4
        *---------------------------------------------------------------------------------------------*                    4
   109=O                        *IN13               3A CHAR        1                                                  4000002
   110=O                        *IN26               1A CHAR        1                                                  4000003
   111=O                        *IN28               2A CHAR        1                                                  4000004
   112=O                        CNUM                9S ZONE      6,0              CUSTOMER NUMBER                    4000005
   113=O                        DLTADD             18A CHAR        9                                                  4000006
   114=O                        TIMSTC             30S ZONE     12,0               TIME STAMP FIELD                  4000007
   115=O                        CNAME              50A CHAR       20             CUSTOMER NAME                      4000008
   116=O                        ADRES1             90A CHAR       40             ADDRESS FIELD     1                4000009
   117=O                        ADRES2            130A CHAR       40             ADDRESS FIELD     2                4000010
   118=O                        CSTWKA            280A CHAR      150             CST WORK AREA                      4000011
   119=O                        TIMEC             286A CHAR        6                                                4000012
   120=O                        INUM              292S ZONE      6,0             ITEM NUMBER                        4000013
   121=O                        TIMSTI            304S ZONE     12,0             TIME STAMP FIELD                   4000014
   122=O                        IDESC             319A CHAR       15             ITEM DESCRIPTION                   4000015
   123=O                        IPRICE            324S ZONE      5,2             ITEM PRICE                         4000016
   124=O                        ONHAND            329S ZONE      5,0             ON HAND                            4000017
   125=O                        ITMWKA            479A CHAR      150             ITEM WORK AREA                     4000018
   126=O                        TIMEI             485A CHAR        6                                                4000019
                                                   M05
 5716RG1 V3R6M0  950929 RN        IBM ILE RPG/400         PFREXP/CSTPEX           RCHASM05   01/21/97 13:35:23        Page      5
Line   <---------------------- Source Specifications ---------------------------><---- Comments ----> Do  Page  Change Src Seq
Number ....1....+....2....+....3....+....4....+....5....+....6....+....7....+....8....+....9....+...10 Num Line  Date   Id  Number
   127=O                        DLTADI            494A CHAR        9                                                4000020
   128=O                        CNLOTO            510A CHAR       16                                                4000021
      * * * * *  E N D  O F  S O U R C E  * * * * *
```

(Remainder of Compiler Listing not included for brevity.)

Figure 22 (Part 5 of 5). CSTPEX Program Compiled Source Statement Numbers (ILE)

5.3 PEX PROFILE OPM Example

This PEX PROFILE example uses the same program CLCSTPEXHI that was used in the PEX STATS example in Section 4.5, “PEX STATS HIER Example - Program at Multiple Levels” on page 83, and in the PEX PROFILE ILE program example in Section 5.2, “PEX PROFILE ILE Example” on page 105. However, Program CSTPEXO (OPM) is called instead of ILE program CSTPEX.

Only the PRTPEXRPT TYPE(*PROFILE) *Profile Information* section is shown in Figure 23 on page 113. Figure 24 on page 114 shows a compiler listing of program OPM CSTPEXO.

As discussed earlier in this chapter, the OPM statement number that appears in the PRTPEXTRPT Profile Information section must be converted to its hexadecimal equivalent. Find this hexadecimal value under the *INST* column heading on the create program compile listing *Generated Output* (MI instructions) section.

On that same print line, you should see the HLL statement number under the *Break* column heading.

```
                                        Performance Explorer Report                    1/23/97  9:09:13
                                            Profile Information                              Page   12
Library . . : COOL
Member. . . : BRPRFOPM
Description : RB PROFILE OPM CSTPEXO
                          Histogram     Hit   Hit   Cum   Start             Map    Stmt   Name
                                        Cnt    %     %    Addr              Flag   Numb
-------------------------------------------------------------------------------------------------------------
                         ********       91  23.0  23.0 1D9627C2BB0039D8   MP      241  CSTPEXO  1
                          ******        66  16.7  39.6 1D9627C2BB0029D0   MP      105  CSTPEXO
                           *****        57  14.4  54.0 1D9627C2BB0027F8   MP       98  CSTPEXO
                            ****        52  13.1  67.2 1D9627C2BB002A7C   MP      107  CSTPEXO
                             ***        33   8.3  75.5 1D9627C2BB0028B0   MP       99  CSTPEXO
                              **        30   7.6  83.1 1D9627C2BB0027C4   MP       97  CSTPEXO
                              **        24   6.1  89.1 1D9627C2BB003A98   MP      242  CSTPEXO
                               *        17   4.3  93.4 1D9627C2BB003AF4   MP      243  CSTPEXO
                                         9   2.3  95.7 1D9627C2BB002924   MP      100  CSTPEXO
                                         3   0.8  96.5 1D9627C2BB002B04   MP      108  CSTPEXO
                                         3   0.8  97.2 1D9627C2BB00424C   MP      276  CSTPEXO
                                         2   0.5  97.7 1D9627C2BB002A6C   MP      106  CSTPEXO
                                         1   0.3  98.0 1D9627C2BB002B0C   MP      109  CSTPEXO
                                         1   0.3  98.2 1D9627C2BB002B30   MP      110  CSTPEXO
                                         1   0.3  98.5 1D9627C2BB002B88   MP      115  CSTPEXO
                                         1   0.3  98.7 1D9627C2BB002BC0   MP      119  CSTPEXO
                                         1   0.3  99.0 1D9627C2BB002C88   MP      126  CSTPEXO
                                         1   0.3  99.2 1D9627C2BB002DCC   MP      135  CSTPEXO
                                         1   0.3  99.5 1D9627C2BB0041E0   MP      275  CSTPEXO
                                         1   0.3  99.7 1D9627C2BB005AC4   MP      398  CSTPEXO
                                         1   0.3 100.0 1D9627C2BB005B00   MP      399  CSTPEXO
```

Figure 23. PRTPEXRPT Profile Example for CLCSTPEXHI, CSTPEXO (OPM)

Notes for STATS PROFILE CSTPEXO (OPM) Program Example:

This example describes how to find the *real HLL source statement number* for the highest CPU consumption statement in this PEX PROFILE report showing an OPM program - CSTPEXO.

In Figure 23, you see statement number 241 at **1** had the highest hit percentage of 23.0. If you look at the source statement listing in Figure 24 on page 114, you see there is no source statement 24100.

As we discussed earlier in this chapter, for OPM programs in PEX PROFILE reports you must convert the 241 to its hexadecimal equivalent of X'F1.' X'F1' is actually the hexadecimal instruction number of the MI instruction generated by the HLL compiler.

To find the actual HLL source statement number, you must have compiled the program with the *LIST (show generated MI instructions) option. Take the hexadecimal value and scan for it within the *Generated Output* section of the compiler listing. Scan for the hexadecimal value under the *INST* heading. If you are patient, you find this at **1MI** in Figure 24 on page 114. In our example, this is at the line with **685** under the *SEQ*uence number column in the leftmost margin. In the middle of that line, you see BRK '8500' and in the rightmost margin, under the column *Break*, you see 8500. 8500 is the HLL source statement number you see in this example at **1L**.

```
5716RG1 V3R6M0  950929               IBM RPG/400                      PFREXP/CSTPEXO       01/23/97  08:55:12      Page       1
Compiler . . . . . :   IBM RPG/400
Command Options:
  Program  . . . . . :   PFREXP/CSTPEXO
  Source file  . . . . . :   PFREXP/QRPGSRC
  Source member  . . . . . :   CSTPEXO
  Source listing options . . . . . :   *SOURCE     *XREF       *GEN        *NODUMP     *NOSECLVL   *NOSRCDBG   *NOLSTDBG
  Generation options . . . . . :   *LIST       *NOXREF     *NOATR      *NODUMP     *NOOPTIMIZE
  Source listing indentation . . . :   *NONE
  Type conversion options  . . . . :   *NONE
  Sort sequence  . . . . . :   *HEX
  Language identifier  . . . . . :   *JOBRUN
  SAA flagging . . . . . :   *NOFLAG
  Generation severity level  . . . :   9
  Print file . . . . . :   *LIBL/QSYSPRT
  Replace program  . . . . . :   *YES
  Target release . . . . . :   *CURRENT
  User profile . . . . . :   *USER
  Authority  . . . . . :   *LIBCRTAUT
  Text . . . . . :   *SRCMBRTXT
  Phase trace  . . . . . :   *NO
  Intermediate text dump . . . . . :   *NONE
  Snap dump  . . . . . :   *NONE
  Codelist . . . . . :   *NONE
  Ignore decimal data error  . . . :   *NO
  Allow null values  . . . . . :   *NO
Actual Program Source:
  Member . . . . . :   CSTPEXO
  File . . . . . :   QRPGSRC
  Library  . . . . . :   PFREXP
  Last Change  . . . . . :   01/23/97  08:54:57
  Description  . . . . . :   RPG READ CSTFIL/CHAIN ITMFIL OPM for Perf Exp lab
```

Figure 24 (Part 1 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716RG1 V3R6M0  950929               IBM RPG/400                     PFREXP/CSTPEXO       01/23/97  08:55:12      Page       2
SEQUENCE                                                                      IND    DO    LAST       PAGE   PROGRAM
NUMBER    *...1....+....2....+....3....+....4....+....5....+....6....+....7...*  USE    NUM   UPDATE     LINE   ID
                     S o u r c e   L i s t i n g
     100  H                                                                                  08/18/95           CSTPEX
     200  F******* CSTPEXO - OPM VERSION                                                     08/18/95
     300  F*CUSTOMER FILE READ PROGRAM FOR PERFORMANCE TEST                                  06/15/92
     400  F*
     500  FCSTFIL  IF  E           K        DISK                                           08/14/95
           RECORD FORMAT(S):  LIBRARY PFREXP FILE CSTFIL.
                    EXTERNAL FORMAT CSTREC RPG NAME CSTREC
     600  FITMFIL  IF  E           K        DISK                                           08/15/95
           RECORD FORMAT(S):  LIBRARY PFREXP FILE ITMFIL.
                    EXTERNAL FORMAT ITMREC RPG NAME ITMREC
     700  FBUPAP1IDCF  E                    WORKSTN                                        08/15/95
           RECORD FORMAT(S):  LIBRARY PFREXP FILE BUPAP1ID.
                    EXTERNAL FORMAT PROMPT RPG NAME PROMPT
 A000000   INPUT  FIELDS FOR RECORD CSTREC FILE CSTFIL FORMAT CSTREC.
 A000001                                      1   6OCNUM                CUSTOMER NUMBER
 A000002                                      7  26 CNAME               CUSTOMER NAME
 A000003                                     27  66 ADRES1              ADDRESS FIELD     1
 A000004                                     67 106 ADRES2              ADDRESS FIELD     2
 A000005                                    107 107 STATUS              STATUS FIELD
 A000006                                    108 119OTIMSTC               TIME STAMP FIELD
 A000007                                    120 269 CSTWKA              CST WORK AREA
 B000000   INPUT  FIELDS FOR RECORD ITMREC FILE ITMFIL FORMAT ITMREC.
 B000001                                      1   2 ITMID               ITEM ID FLD
 B000002                                      3   8OINUM                ITEM NUMBER
 B000003                                      9  23 IDESC               ITEM DESCRIPTION
 B000004                                     24  28 2IPRICE             ITEM PRICE
 B000005                                     29  33 OONHAND             ON HAND
 B000006                                     34  34 IDELET              ITEM DELETE CODE
 B000007                                     35  46OTIMSTI              TIME STAMP FIELD
 B000008                                     47 196 ITMWKA              ITEM WORK AREA
 C000000   INPUT  FIELDS FOR RECORD PROMPT FILE BUPAP1ID FORMAT PROMPT.
 C000000         ITEM PROMPT FORMAT
 C000001                                      1   1 *INO1               END PROGRAM
 C000002                                      2   7OCNUM                CUSTOMER NUMBER
 C000003                                      8  13OINUM                ITEM NUMBER
     800  C           *ENTRY    PLIST
     900  C                     PARM           MAXRCD 155                                  06/09/92
    1000  C                     PARM           CPULUP 155                                  07/29/94
    1100  C                     PARM           CMPCNM 155                                  08/14/95
    1200  C                     PARM           STOP    1                                   08/14/95
    1300  C                     Z-ADD1         CTR     6O
    1400  C                     MOVE '1'       INOUT                                       08/15/95
    1500  C                     CALL 'COMPTIME'                                            08/15/95
    1600  C                     PARM           TIMEC   6                                   08/15/95
    1700  C                     PARM           INOUT   1                                   08/15/95
```

Figure 24 (Part 2 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716RG1 V3R6M0  950929               IBM RPG/400                     PFREXP/CSTPEXO       01/23/97  08:55:12      Page       3
SEQUENCE                                                                      IND    DO    LAST       PAGE   PROGRAM
NUMBER    *...1....+....2....+....3....+....4....+....5....+....6....+....7...*  USE    NUM   UPDATE     LINE   ID
    1800  C           CTR       DOWLEMAXRCD                                          B001
    1900  C* DO TO CONSUME CPU                                                              02/04/94       *
    2000  C                     Z-ADDCPULUP    CPUCTR 155                             001   07/29/94         S
    2100  C           CPUCTR    DOWGE1                                               B002   02/04/94
    2200  C           MAXRCD    MULT CPUCTR    LUPVAL 155                             002   02/04/94
    2300  C           LUPVAL    DIV  CPUCTR    LUPVAL                                 002   02/04/94
    2400  C                     EXSR MULT                                            002   01/23/97
    2500  C           CPUCTR    SUB  1         CPUCTR                                 002   02/04/94
    2600  C                     END                                                  E002   02/04/94
    2700  C* END CONSUME CPU                                                                02/04/94       *
    2800  C*** CHANGED TO READ CSTREC                                                       08/14/95         S
    2900  C                     READ CSTREC                  31                  3    001   08/14/95
    3000  C           *IN31     IFEQ '1'                                             B002   08/14/95
    3100  C                     GOTO WTDSP                                           002   08/14/95
    3200  C                     END                                                  E002   08/15/95
    3300  C*************************************************************                   08/14/95
    3400  C           CMPCNM    IFEQ CNUM                                            B002   08/14/95
    3500  C                     MOVE CSTWKA    CWKA  150                             002   08/14/95
    3600  C                     MOVE CNAME     CNAMA  20                             002   08/14/95
    3700  C                     MOVE CNUM      CNUMA   60                            002   08/14/95
    3800  C                     MOVE ADRES1    ADRS1A 40                             002   08/14/95
    3900  C                     MOVE ADRES2    ADRS2A 40                             002   08/14/95
    4000  C           STOP      IFEQ 'Y'                                             B003   08/14/95
    4100  C                     GOTO WTDSP                                           003   08/14/95
    4200  C                     END                                                  E003   08/14/95
    4300  C                     ELSE                                                 X002   08/14/95
    4400  C********                                                                         08/15/95
    4500  C                     Z-ADD1         CTRDMY  60                            002   08/15/95
    4600  C********                                                                         08/15/95
    4700  C                     END                                                  E002   08/14/95
    4800  C           CTR       ADD  1         CTR                                   001   08/15/95
    4900  C                     END                                                  E001   08/15/95
    5000  C           WTDSP     TAG                                                        08/14/95
    5100  C                     MOVE '2'       INOUT                                       08/15/95
    5200  C                     CALL 'COMPTIME'                                            08/15/95
    5300  C                     PARM           TIMEC   6                                   08/15/95
    5400  C                     PARM           INOUT   1                                   08/15/95
    5500  C******                                                                           08/15/95
    5600  C******  IF CUST NUMBER FIELD CNUM EQUAL CSTNBR DISPLAY SAVED FIELDS              08/15/95
    5700  C******  OTHERWISE USE LAST FIELDS LAST READ FROM CSTFIL - END OF FIL             08/15/95           E
    5800  C******  OR MAXRCD REACHED.                                                      08/15/95
    5900  C*****                                                                          08/15/95
    6000  C           *IN31     IFNE '1'                                             B001   08/15/95
    6100  C           MAXRCD    ORNE CTR                                              001   08/15/95
    6200  C                     MOVE CWKA      CSTWKA                                001   08/14/95
    6300  C                     MOVE CNAMA     CNAME                                 001   08/14/95
    6400  C                     MOVE CNUMA     CNUM                                  001   08/14/95
    6500  C                     MOVE ADRS1A    ADRES1                                001   08/14/95
    6600  C                     MOVE ADRS2A    ADRES2                                001   08/14/95
    6700  C                     END                                                  E001   08/15/95
    6800  C                     Z-ADDCMPCNM    INUM                                        08/15/95
    6900  C*************************************                                           08/15/95
    7000  C*************************************                                           08/15/95
    7100  C                     MOVE '1'       INOUT                                       08/15/95
```

Figure 24 (Part 3 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716RG1 V3R6M0  950929               IBM RPG/400                     PFREXP/CSTPEXO       01/23/97  08:55:12      Page       4
SEQUENCE                                                                      IND    DO    LAST       PAGE   PROGRAM
NUMBER    *...1....+....2....+....3....+....4....+....5....+....6....+....7...*  USE    NUM   UPDATE     LINE   ID
    7200  C                   CALL 'COMPTIME'                                                08/15/95
    7300  C                   PARM           TIMEI   6                                       08/15/95
    7400  C                   PARM           INOUT   1                                       08/15/95
    7500  C           INUM    CHAINITMFIL              44                    1              08/15/95
    7600  C                   MOVE '2'       INOUT                                           08/15/95
    7700  C                   CALL 'COMPTIME'                                                08/15/95
    7800  C                   PARM           TIMEI   6                                       08/15/95
    7900  C                   PARM           INOUT   1                                       08/15/95
    8000  C                   WRITEPROMPT                                                    08/14/95
    8100  C                   READ BUPAP1ID                97                    3          08/15/95
    8200  C                   SETON                      LR                    1          08/15/95
    8300  C                   RETRN
    8400  C           MULT    BEGSR                                                          01/23/97
      1L
    8500  C           MAXRCD  MULT CPUCTR    LUPVAL 155                                      01/23/97
    8600  C                   ENDSR                                                          01/23/97
  D000000   OUTPUT FIELDS FOR RECORD PROMPT FILE BUPAP1ID FORMAT PROMPT.
  D000000         ITEM PROMPT FORMAT
  D000001                           *IN13      3  CHAR    1
  D000002                           *IN26      1  CHAR    1
  D000003                           *IN28      2  CHAR    1
  D000004                           CNUM       9  ZONE  6,0                   CUSTOMER NUMBER
  D000005                           DLTADD    18  CHAR    9
  D000006                           TIMSTC    30  ZONE 12,0                    TIME STAMP FIELD
  D000007                           CNAME     50  CHAR   20                   CUSTOMER NAME
  D000008                           ADRES1    90  CHAR   40                   ADDRESS FIELD     1
  D000009                           ADRES2   130  CHAR   40                   ADDRESS FIELD     2
  D000010                           CSTWKA   280  CHAR  150                   CST WORK AREA
  D000011                           TIMEC    286  CHAR    6
  D000012                           INUM     292  ZONE  6,0                   ITEM NUMBER
  D000013                           TIMSTI   304  ZONE 12,0                   TIME STAMP FIELD
  D000014                           IDESC    319  CHAR   15                   ITEM DESCRIPTION
  D000015                           IPRICE   324  ZONE  5,2                   ITEM PRICE
  D000016                           ONHAND   329  ZONE  5,0                   ON HAND
  D000017                           ITMWKA   479  CHAR  150                   ITEM WORK AREA
  D000018                           TIMEI    485  CHAR    6
  D000019                           DLTADI   494  CHAR    9
  D000020                           CNLOTO   510  CHAR   16
          * * * * *  E N D  O F  S O U R C E  * * * * *
         A d d i t i o n a l  D i a g n o s t i c  M e s s a g e s
* 7086       500   RPG PROVIDES BLOCK OR UNBLOCK SUPPORT FOR FILE CSTFIL.
```

Figure 24 (Part 4 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716RG1 V3R6M0  950929              IBM RPG/400                     PFREXP/CSTPEXO      01/23/97  08:55:12      Page       5
                 K e y   F i e l d   I n f o r m a t i o n

                     PHYSICAL    LOGICAL
       FILE/RCD      FIELD       FIELD       ATTRIBUTES

   01  CSTFIL
         CSTREC
                     CNUM                    ZONE  6,0  SIGNED
   02  ITMFIL
         ITMREC
                     INUM                    ZONE  6,0  SIGNED
5716RG1 V3R6M0  950929              IBM RPG/400                     PFREXP/CSTPEXO      01/23/97  08:55:12      Page       6
                      C r o s s   R e f e r e n c e

File and Record References:
       FILE/RCD    DEV/RCD     REFERENCES (D=DEFINED)
   03  BUPAP1ID    WORKSTN         700D    8100
         PROMPT                    700D C000000     8000  D000000
   01  CSTFIL      DISK            500D
         CSTREC                    500D A000000     2900
   02  ITMFIL      DISK            600D    7500
         ITMREC                    600D B000000

Field References:
       FIELD       ATTR    REFERENCES (M=MODIFIED D=DEFINED)
       *ENTRY      PLIST       800D
* 7031  *IN01       A(1)    C000001
       *IN13       A(1)    D000001D
       *IN26       A(1)    D000002D
       *IN28       A(1)    D000003D
       *IN31       A(1)       3000     6000
       ADRES1      A(40)   A000003D    3800     6500M D000008D
       ADRES2      A(40)   A000004D    3900     6600M D000009D
```

(Remainder of field and indicator references and summary sections removed for brevity.)

Figure 24 (Part 5 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716RG1 V3R6M0  950929              IBM RPG/400                     PFREXP/CSTPEXO      01/23/97  08:55:12      Page       9
                         F i n a l   S u m m a r y
Message Count:  (by Severity Number)
            TOTAL    00     10     20     30     40     50
              8       8      0      0      0      0      0
Program Source Totals:
   Records . . . . . . . . . . :   86
   Specifications  . . . . . . :   70
   Table Records . . . . . . . :   0
   Comments  . . . . . . . . . :   16
PRM has been called.
```

Figure 24 (Part 6 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716SS1 V3R6M0 950929                          Generated Output                          01/23/97 08:55:12  Page    10
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8   Break
00001                                                                                                                    ;
00002                                           BRK '.ENTRY  '                          /*Z1STBRK*/                ;  .ENTRY
                                                                                                                            .ENTRY
                                                /* QRGSF 06/14/94 */                                                    .ENTRY
00003                                                                                                                    ;  .ENTRY
                                                /* QRGSI 04/15/94 */                                                    .ENTRY
00004                                                                                                                    ;  .ENTRY
                                                /* QRGSC 05/18/93 */                                                    .ENTRY
00005                                                                                                                    ;  .ENTRY
                                                /* QRGSO 10/17/94 */                                                    .ENTRY
00006                                                                                                                    ;  .ENTRY
                                                /* QRGD1 04/20/94 */                                                    .ENTRY
00007                                                                                                                    ;  .ENTRY
                                                /* QRGAE 04/19/95 */                                                    .ENTRY
00008                                                                                                                    ;  .ENTRY
00009                                           ENTRY .ENTRY(*ENTRY) EXT                /*ZENTRY*/                 ;  .ENTRY
00010  0001 000004  2252 000A 0481             SETIEXIT .RPGXIEX,.RPXIEXP              /*SET UP INVOCATION EXIT P   .ENTRY
                                                                                        GM*/                         ;  .ENTRY
00011  0002 00000A  1011 046E                   B .START                                /*BEGIN OF PROGRAM */      ;  .ENTRY
00012                                           BRK '.STOP'                                                          ;  .STOP
00013                                  .STOP:                                                                        ;  .STOP
00014  0003 00000E  3147 0008 2001             SUBN(S) .INVOCNT, 1                     /*ALLOW CALL TO THIS PGM*/;  .STOP
00015  0004 000014  02A1 0000                   RTX *                                   /* RETURN */                    .STOP
                                                                                        /*ZSTAR*/                  ;  .STOP
                                                                                                                            .STOP
                                                /*START OF THE PROGRAM*/                                                .STOP
00016                                                                                                                    ;  .STOP
                                                /* STATIC AREA FOR INDIC/FIELDS */                                      .STOP
00017                                                                                                                    ;  .STOP
                                                /* START OF STRUCTURE POINTED BY .DMPTRLT*/                             .STOP
00018                                                                                                                    ;  .STOP
00019                                           DCL DD .RPGPGM CHAR(1) BDRY(16) INIT                                     ;  .STOP
00020                                           DCL DD .FIRSTSW CHAR(1) INIT('0')       /* PROGRAM CALLED BEFORE *    .STOP
                                                                                        /                            ;  .STOP
00021                                           DCL DD .EOJSW CHAR(1) INIT('0')         /*PROGRAM WENT TO EOJ*/    ;  .STOP
00022                                           DCL DD .DUMPSW CHAR(1) INIT('0')        /* DUMP REQUESTED*/         ;  .STOP
00023                                           DCL DD .ERRTERM CHAR(1) INIT('0')       /*PROGRAM TERMINATED */    ;  .STOP
00024                                           DCL DD .INVOCNT ZND(1,0) INIT(Z'0')                                      ;  .STOP
00025                                           DCL DD .INVOCER CHAR(4) INIT('8888')                                     ;  .STOP
00026                                           DCL SYSPTR .RPGXIEX INIT('QRGXINVX', TYPE(PGM,1))                        .STOP
                                                                                        /*INVOCATION EXIT PROGRAM*   .STOP
                                                                                        /                            ;  .STOP
00027                                           DCL DD .INVXLVL BIN(2) INIT(2)          /*INTERFACE LEVEL FOR QRGX   .STOP
                                                                                        INVX*/                          .STOP
                                                                                        /*END OF STATIC AREA STRUC   .STOP
                                                                                        TURE*/                       ;  .STOP
00028                                           DCL DD .BLANKS CHAR(140) INIT((140)' ')                                  ;  .STOP
00029                                           DCL DD .ZEROS CHAR(30) INIT((30)'0')                                     ;  .STOP
00030                                           DCL CON *ON CHAR(1) INIT('1')           /* SET/CHECK INDICATORS ON    .STOP
                                                                                         */                          ;  .STOP
00031                                           DCL CON *OFF CHAR(1) INIT('0')          /* SET/CHECK INDICATORS OF    .STOP
                                                                                        F */                         ;  .STOP
00032                                           DCL DD .INDIC CHAR(1) BAS(*)                                             ;  .STOP
00033                                           DCL DD *INIT CHAR(1) INIT('0')          /*START INDIC AREA, DUMMY    .STOP
                                                                                        INDIC*/                      ;  .STOP
00034                                           DCL DD *INXX CHAR(1) INIT('1')          /*INDICATOR ALWAYS ON*/      .STOP
```

Figure 24 (Part 7 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716SS1 V3R6M0 950929                          Generated Output                          01/23/97 08:55:12  Page    11
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8   Break
                                                                                        /*ZSTART*/                 ;  .STOP
00035                                           DCL DD *INKA CHAR(1) INIT('0')          /*ZFIXIND*/                ;  .STOP
00036                                           DCL DD *INKB CHAR(1) INIT('0')          /*ZFIXIND*/                ;  .STOP
00037                                           DCL DD *INKC CHAR(1) INIT('0')          /*ZFIXIND*/                ;  .STOP
00038                                           DCL DD *INKD CHAR(1) INIT('0')          /*ZFIXIND*/                ;  .STOP
00039                                           DCL DD *INKE CHAR(1) INIT('0')          /*ZFIXIND*/                ;  .STOP
```

(Remaining DCL (declare variables) have been removed for brevity,)

Figure 24 (Part 8 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716SS1 V3R6M0 950929                          Generated Output                          01/23/97 08:55:12  Page    11
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8   Break
                                                                                      /*ZSTART*/               ;  .STOP
 (*GETIN is the start of RPG generated instructions for the *GETIN (input) part of the RPG cycle.)


00240                                             BRK '*GETIN'                                                ;  *GETIN
00241                                  *GETIN:                                      /*BEGIN OF GET INPUT RECOR   *GETIN
                                                                                    D*/                        ;  *GETIN
00242  0016 00008C  30B2 0096 00C9               CPYBLA .PGMERRN,'*GETIN  '       /*ZDRBEG*/                 ;  *GETIN
00243  0017 000092  1CC2 4000 002C 000F          CMPBLA(B) *INLR,*OFF/EQ(.DRLROFF) /* LR OFF?*/                ;  *GETIN
                    00CA                                                                                       *GETIN
00244  0018 00009C  10BE 002B 000E               CPYBREP .INLVLS,*ON              /* SET ON ALL LEVEL INDICA   *GETIN
                                                                                    TORS */                    ;  *GETIN
00245  0019 0000A2  1011 00E2                    B *TOTC                          /* GOTO TOTAL CALCS */     ;  *GETIN
00246                                  .DRLROFF:                                                             ;  *GETIN
00247  001A 0000A6  30BE 002B 000F               CPYBREP .INLVLS,*OFF             /* SET OFF L1-L9,LR */        *GETIN
                                                                                    /*ZDLVLCK*/                ;  *GETIN
00248  001B 0000AC  1CC2 4000 00CB 000E          CMPBLA(B) .LVLSW,*ON/EQ(*TOTC)   /* BYPASS SW */               *GETIN
                    00E2                                                            /*ZDRL03*/                 ;  *GETIN

 (More lines have been removed for brevity,)
```

Figure 24 (Part 9 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716SS1 V3R6M0 950929                          Generated Output                          01/23/97 08:55:12  Page    19
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8   Break
00326  004C 0001D8  1CC2 4000 002C 000E          CMPBLA(B) *INLR,*ON/EQ(.END)     /* END OF PROGRAM*/           *OFL
                    0493                                                            /*ZCKLR*/                  ;  *OFL
00327                                             BRK '*DETC  '                                               ;  *DETC
00328                                  *DETC:                                       /* BEGIN OF DETAIL CALCULA   *DETC
                                                                                    TIONS */                      *DETC
                                                                                                               ;  *DETC
00329  004D 0001E2  30B2 0096 00E9               CPYBLA .PGMERRN,'*DETC   '       /*ZDC*/                    ;  *DETC
                                                                                                                  *DETC
                                                  /* QRGGC 05/01/92 */                                            *DETC
00330                                                                                                          ;  *DETC
                                                  /*  GC  DETAIL             BASE CALC CODE GEN */               *DETC

 (Source statement references under Break column start here.)

00331                                                                                                          ;  *DETC
00332                                             BRK '1300    '                                              ;  1300
                                                  /* QRGAC 08/29/91 */                                            1300
00333                                                                                                          ;  1300
00334  004E 0001E8  1042 0048 00EA               CPYNV CTR,P'1'                                                 ;  1300
                                                  /* QRGGC 05/01/92 */                                            1300
00335                                                                                                          ;  1300
00336                                             BRK '1400    '                                              ;  1400
                                                  /* QRGMC 10/05/95 */                                            1400
00337                                                                                                          ;  1400
00338  004F 0001EE  10B6 0049 20F1               CPYBRA INOUT,C'1'                                              ;  1400
                                                  /* QRGGC 05/01/92 */                                            1400
00339                                                                                                          ;  1400

 (More lines have been removed for brevity,)
```

Figure 24 (Part 10 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716SS1 V3R6M0 950929                          Generated Output                          01/23/97 08:55:12  Page    20
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8   Break
                                                                                      /*ZCALER*/               ;  1500
00355  005C 00024C  1011 00DF                    B .ERX                             /*NO ERR INDICATOR*/        1500
                                                                                      /*ZCALERB*/              ;  1500
00356                                  .CRC0001:                                      /*RETURN WITH NO ERR*/   ;  1500
00357  005D 000250  3042 0093 0465              CPYNV .PGMERST,.RPGRC                 /*INDIC TYPE OF RETURN*/    1500
                                                                                      /*ZCALLRCB*/             ;  1500
00358  005E 000256  0293 0153 0000 014A          CALLI .PL001.2,*,.PLISTRT             /*ZCALLPB*/              ;  1500
00359                                  .CER0001 :                                     /*ERR on CALL*/             1500
                                                                                      /*ZCALERD*/              ;  1500
                                                                                                                  1500
                                               /* QRGGC 05/01/92 */                                              1500
00360                                                                                                         ;  1500
00361                                          BRK '1800    '                                                ;  1800
                                               /* QRGCC 08/06/92 */                                              1800
00362                                                                                                         ;  1800
00363                                  .DOF0001:                                                              ;  1800
00364  005F 00025E  3C46 1000 0048 0044          CMPNV(B) CTR,MAXRCD/HI( .ELF0001)                              ;  1800
                    0109                                                                                          1800
00365                                  .BLF0001:                                                              ;  1800
00366                                          BRK '2000    '                                                ;  2000
                                               /* QRGAC 08/29/91 */                                              2000
00367                                                                                                         ;  2000
00368  0060 000268  3042 004B 0045              CPYNV CPUCTR,CPULUP                                            ;  2000
                                               /* QRGGC 05/01/92 */                                              2000
00369                                                                                                         ;  2000
00370                                          BRK '2100    '                                                ;  2100
                                               /* QRGCC 08/06/92 */                                              2100
00371                                                                                                         ;  2100
00372                                  .DOF0002:                                                              ;  2100
00373  0061 00026E  3C46 2000 004B 00F3          CMPNV(B) CPUCTR,P'1'/LO( .ELF0002)                             ;  2100
                    00FA                                                                                          2100
00374                                  .BLF0002:                                                              ;  2100
00375                                          BRK '2200    '                                                ;  2200
                                               /* QRGAC 08/29/91 */                                              2200
00376                                                                                                         ;  2200
00377                                          DCL DD .PKDWORK PKD(26,10)            /*ARITH WORK AREA*/          2200
                                                                                      /*ZWKAR*/                ;  2200
00378  0062 000278  304B 00F5 0044 004B          MULT .PKDWORK,MAXRCD,CPUCTR                                    ;  2200
00379  0063 000280  1042 004C 00F5              CPYNV LUPVAL,.PKDWORK                                          ;  2200
                                               /* QRGGC 05/01/92 */                                              2200
00380                                                                                                         ;  2200
00381                                          BRK '2300    '                                                ;  2300
                                               /* QRGAC 08/29/91 */                                              2300
00382                                                                                                         ;  2300
00383  0064 000286  1C46 C000 004B 2000          CMPNV(B) CPUCTR ,0/NEQ(.0001DVD)      /*IS DIVISOR ZERO*/       ;  2300
                    00F8                                                                                          2300
```

Figure 24 (Part 11 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716SS1 V3R6M0 950929                          Generated Output                          01/23/97 08:55:12  Page    21
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8   Break
00384  0065 000290  1042 0094 0093              CPYNV .PGMPROR,.PGMERST                 /*SAVE LAST STATUS*/      ;  2300
00385  0066 000296  10B2 0095 00F6              CPYBLA .PGMERSQ,'2300    '              /*SEQ NUM OF ERR*/        ;  2300
00386  0067 00029C  10B2 0093 00F7              CPYBLA .PGMERST,'00102'                 /*ATTEMPT TO DIV BY ZERO*/;  2300
00387  0068 0002A2  1011 00DF                   B .ERX                                  /*GO TO ERROR HANDLER*/   ;  2300
00388                                  .0001DVD:                                       /*ZDIVCK*/                ;  2300
00389  0069 0002A6  304F 004C 004C 004B          DIV LUPVAL ,LUPVAL ,CPUCTR              /*DIV AND NO MVR*/           2300
                                                                                       /*ZDIV*/                  ;  2300
                                                                                                                  2300
                                          /* QRGGC 05/01/92 */                                                    2300
00390                                                                                                         ;  2300
00391                                     BRK '2400    '                                                     ;  2400
                                          /* QRGBC 03/10/92 */                                                    2400
00392                                                                                                         ;  2400
00393  006A 0002AE  0293 0130 0000 0131          CALLI MULT ,*,.SBR0002                  /*ZEXSRA*/                ;  2400
                                                                                                                  2400
                                          /* QRGGC 05/01/92 */                                                    2400
00394                                                                                                         ;  2400
00395                                     BRK '2500    '                                                     ;  2500
                                          /* QRGAC 08/29/91 */                                                    2500
00396                                                                                                         ;  2500
00397  006B 0002B6  3147 004B 00F9              SUBN (S) CPUCTR,P'1'                                         ;  2500
                                          /* QRGGC 05/01/92 */                                                    2500
00398                                                                                                         ;  2500
00399                                     BRK '2600    '                                                     ;  2600
                                          /* QRGCC 08/06/92 */                                                    2600
00400                                                                                                         ;  2600
00401  006C 0002BC  1011 00F2                   B .DOF0002                              /*ZBR*/                   ;  2600
00402                                  .ELF0002:                                                              ;  2600
00403                                     BRK '2900    '                                                     ;  2900
                                          /* QRGIC 06/25/96 */                                                    2900
00404                                                                                                         ;  2900
00405  006D 0002C0  30B2 0033 000F              CPYBLA *IN31,*OFF                       /*ZSETIND*/               ;  2900
00406  006E 0002C6  10B2 0284 00FB              CPYBLA .F01XSET ,C'00000READ R*DETC   2900   CSTREC  '              2900
                                                                                       /*ZIOSUA*/                ;  2900
00407  006F 0002CC  0082 0161 0241              SETSPP .FIBPTR,.F01FIB                  /* LOCATE FIB */               2900
                                                                                       /*ZIOSUB*/                ;  2900
00408  0070 0002D2  10B2 0259 000F              CPYBLA .F01EIND ,*OFF                   /* SET ERROR INDIC COND */     2900
                                                                                       /*ZIOB*/                  ;  2900
00409  0071 0002D8  1CC2 4000 0261 000F          CMPBLA(B) .F01OPEN,*OFF/EQ(.DMEXL2)     /* ERROR IF NOT OPEN*/         2900
                    041F                                                               /*ZIOSUPA*/               ;  2900
00410  0072 0002E2  10B2 03A1 00FC              CPYBLA .EXTRECN,C'CSTREC    '           /*ZEXT*/                  ;  2900
00411  0073 0002E8  0293 03E8 0000 016D          CALLI .XRVRR01,*,.DRIVRTN               /*ZICALLI*/               ;  2900
00412  0074 0002F0  3CC2 C000 0258 000E          CMPBLA(B) .F01EOF,*ON/NEQ(.OID0001)     /*END OF FILE IS ON? */   ;  2900
                    00FD                                                                                          2900
00413  0075 0002FA  10B2 0033 0258              CPYBLA *IN31,.F01EOF                                         ;  2900
00414                                  .OID0001:                                       /*ZIO2*/                  ;  2900
00415  0076 000300  3CC2 4000 0258 000E          CMPBLA(B) .F01EOF,*ON/EQ(.OID0002)      /*ZIO5*/                  ;  2900
                    00FF                                                                                          2900
```

Starting in the middle of HLL statement 2900 (READ CSTREC) we remove several pages preceding the MI X'F1' instruction.

Figure 24 (Part 12 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8   Break
```

We resume the generated MI instructions with the end of HLL statement 7700 (CALL 'COMPTIME').

```
                                                                                                                          7700
                                          /* QRGGC 05/01/92 */                                                            7700
00626                                                                                                                ;    7700
00627                                     BRK '8000    '                                                               ;    8000
                                          /* QRGIC 06/25/96 */                                                            8000
00628                                                                                                                ;    8000
00629  00D3 00057E  30B2 005E 0124        CPYBLA .CURROP,C'WRITE'                  /* SET OP */                           8000
                                                                                  /*ZIOSUR*/                         ;    8000
00630  00D4 000584  0082 0161 0330        SETSPP .FIBPTR,.F03FIB                   /* LOCATE FIB */                       8000
                                                                                  /*ZIOSUB*/                         ;    8000
00631  00D5 00058A  10B2 0348 000F        CPYBLA .F03EIND ,*OFF                    /* SET ERROR INDIC COND */             8000
                                                                                  /*ZIOB*/                           ;    8000
00632  00D6 000590  1CC2 4000 0350 000E    CMPBLA(B) .F03OPEN,*ON/EQ (.IOD0007)     /*ZIOSUPB*/                        ;    8000
                    0126                                                                                                  8000
00633  00D7 00059A  10B2 0373 0125        CPYBLA .F03XSET ,C'00000WRITER*DETC   8000   PROMPT  '                         8000
                                                                                  /*ZIOSUA*/                         ;    8000
00634  00D8 0005A0  1011 041F             B .DMEXL2                                /* ERROR IF NOT OPEN*/              ;    8000
00635                                .IOD0007:                                    /*ZIOSUPC*/                        ;    8000
00636  00D9 0005A4  2293 0133 0000 0132    CALLI PROMPT ,*,.LINERTN                 /*ZEXP*/                           ;    8000
00637  00DA 0005AC  30B2 03A1 0127        CPYBLA .EXTRECN,C'PROMPT    '            /*ZEXT*/                           ;    8000
00638  00DB 0005B2  10B2 0373 0128        CPYBLA .F03XSET ,C'00000WRITER*DETC   8000   PROMPT  '                         8000
                                                                                  /*ZIOSUA*/                         ;    8000
00639  00DC 0005B8  0293 03D4 0000 016D    CALLI .XRVRW03,*,.DRIVRTN                /*ZICALLI*/                        ;    8000
                                                                                                                          8000
                                          /* QRGGC 05/01/92 */                                                            8000
00640                                                                                                                ;    8000
00641                                     BRK '8100    '                                                               ;    8100
                                          /* QRGIC 06/25/96 */                                                            8100
00642                                                                                                                ;    8100
00643  00DD 0005C0  30B2 0035 000F        CPYBLA *IN97,*OFF                        /*ZSETIND*/                        ;    8100
00644  00DE 0005C6  10B2 0373 0129        CPYBLA .F03XSET ,C'00000READ F*DETC   8100    '                               8100
                                                                                  /*ZIOSUA*/                         ;    8100
00645  00DF 0005CC  0082 0161 0330        SETSPP .FIBPTR,.F03FIB                   /* LOCATE FIB */                       8100
                                                                                  /*ZIOSUB*/                         ;    8100
00646  00E0 0005D2  10B2 0348 000F        CPYBLA .F03EIND ,*OFF                    /* SET ERROR INDIC COND */             8100
                                                                                  /*ZIOB*/                           ;    8100
00647  00E1 0005D8  1CC2 4000 0350 000F    CMPBLA(B) .F03OPEN,*OFF/EQ(.DMEXL2)      /* ERROR IF NOT OPEN*/               8100
                    041F                                                          /*ZIOSUPA*/                        ;    8100
00648  00E2 0005E2  0293 03C1 0000 016D    CALLI .XRVFR03,*,.DRIVRTN                /*ZICALLI*/                        ;    8100
00649  00E3 0005EA  3CC2 C000 0347 000E    CMPBLA(B) .F03EOF,*ON/NEQ(.OID0005)      /*END OF FILE IS ON? */            8100
                    012A                                                                                                  8100
00650  00E4 0005F4  10B2 0035 0347        CPYBLA *IN97,.F03EOF                                                        ;    8100
00651                                .OID0005:                                    /*ZIO2*/                           ;    8100
00652  00E5 0005FA  3CC2 4000 0347 000E    CMPBLA(B) .F03EOF,*ON/EQ(.OID0006)       /*ZIO5*/                           ;    8100
                    012D                                                                                                  8100
00653  00E6 000604  1022 00DB 012B        SETIP .DRTRTN,.IOD0009                                                      ;    8100
00654  00E7 00060A  1011 40DC 0339        B .DRTYPE(.F03NDRT)                      /*DETERMINE RECORD TYPE*/          ;    8100
00655                                .IOD0009:                                    /*ZIO6*/                           ;    8100
00656  00E8 000610  3CC2 4000 037E 012C    CMPBLA(B) .F03MJMN,'03'/EQ(.OID0006)     /*ZIO6D*/                          ;    8100
                    012D                                                                                                  8100
00657  00E9 00061A  10B2 8010 0335 000E    CPYBLA .F03RIDP->.INDIC,*ON              /* SET RECORD ID */                 ;    8100
00658  00EA 000622  1022 00DD 012D        SETIP .IEFRTN,.OID0006                                                      ;    8100
```

Figure 24 (Part 13 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716SS1 V3R6M0 950929                          Generated Output                          01/23/97 08:55:12  Page    30
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8   Break
00659  00EB 000628  1011 40DE 033A               B .FLDETRT(.F03NFET)                    /*EXTRACT FIELDS*/           8100
                                                                                        /*ZIO6 /* EXTRACT FIELDS *   8100
                                                                                        /                            8100
                                                                                                                     8100
                                                                                        /*ZIO6A*/                ;   8100
00660                                  .OID0006:                                        /*ZLABL*/                ;   8100
                                                                                                                     8100
                                               /* QRGGC 05/01/92 */                                                  8100
00661                                                                                                            ;   8100
00662                                          BRK '8200    '                                                    ;   8200
                                               /* QRGBC 03/10/92 */                                                  8200
00663                                                                                                            ;   8200
00664  00EC 00062E  30B2 002C 000E               CPYBLA *INLR,*ON                        /*ZSETIND*/              ;   8200
                                                                                                                     8200
                                               /* QRGGC 05/01/92 */                                                  8200
00665                                                                                                            ;   8200
00666                                          BRK '8300    '                                                    ;   8300
                                               /* QRGBC 03/10/92 */                                                  8300
00667                                                                                                            ;   8300
00668  00ED 000634  1011 0494                   B .RETURN                               /*RETURN TO CALLER*/         8300
                                                                                        /*ZRETURN*/              ;   8300
                                                                                                                     8300
                                               /* QRGGC 05/01/92 */                                                  8300
00669                                                                                                            ;   8300
                                               /* ROOT PHASE GENERATES THE FOLLOWING CODE*/                          8300
                                               /*ZROOTMSG*/                                                         8300
00670                                                                                                            ;   8300
00671  00EE 000638  1011 012E                   B *DETL                                 /*SEPERATES BRK POINTS,LAS   8300
                                                                                        T DCALC AND DLINE*/        ;   8300
00672                                          BRK '*DETL   '                                                   ;   *DETL
00673                                  *DETL:                                          /* BEGIN OF DETAIL LINES *   *DETL
                                                                                        /                            *DETL
                                                                                                                 ;   *DETL
00674  00EF 00063C  30B2 0096 012F               CPYBLA .PGMERRN,'*DETL   '              /*ZDL*/                  ;   *DETL
                                                                                                                     *DETL
                                               /* ROOT PHASE GENERATES THE FOLLOWING CODE*/                          *DETL
                                               /*ZROOTMSG*/                                                         *DETL
00675                                                                                                            ;   *DETL
00676  00F0 000642  1011 00C8                   B *GETIN                                /* GOTO GET NEXT RECORD */   *DETL
                                                                                        /*ZDLEND*/               ;   *DETL
                                                                                                                     *DETL
                                               /* QRGGC 05/01/92 */                                                  *DETL
00677                                                                                                            ;   *DETL
                                               /*  GC  SUBROUTINES        BASE CALC CODE GEN */                      *DETL
00678                                                                                                            ;   *DETL
```

Figure 24 (Part 14 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

```
5716SS1 V3R6M0 950929                          Generated Output                          01/23/97 08:55:12  Page    31
 SEQ   INST Offset    Generated Code     *... ... 1 ... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8   Break

00679                                          BRK '8400    '                                                    ;   8400
                                               /* QRGBC 03/10/92 */                                                  8400
00680                                                                                                            ;   8400
00681                                          ENTRY MULT INT                          /*ZBEGSR*/               ;   8400
                                                                                                                     8400
                                               /* QRGGC 05/01/92 */                                                  8400
00682                                                                                                            ;   8400
                                                  1MI
00683                                          BRK '8500    '                                                    ;   8500
                                               /* QRGAC 08/29/91 */                                                  8500
00684  1MI                                                                                                 1MI ;     8500
00685  00F1 000646  304B 00F5 0044 004B          MULT .PKDWORK,MAXRCD,CPUCTR                                      ;   8500
00686  00F2 00064E  1042 004C 00F5               CPYNV LUPVAL,.PKDWORK                                            ;   8500
                                               /* QRGGC 05/01/92 */                                                  8500
00687                                                                                                            ;   8500
00688                                          BRK '8600    '                                                    ;   8600
                                               /* QRGBC 03/10/92 */                                                  8600
```

(Remaining MI instruction statements removed for brevity.)

Figure 24 (Part 15 of 15). CSTPEXO Program Compiled Source Statement Numbers (OPM)

Chapter 6. Performance Explorer *TRACE Option

The PEX TRACE tool provides the most granular level of performance detail of any performance analysis tool available on RISC AS/400 systems. It is assumed that users of this TRACE option already have a detailed understanding of AS/400 performance.

PEX TRACE is included as part of standard RISC-based OS/400. As shipped, PEX TRACE provides a single set of PEX TRACE *performance trace events* that can be collected. While you can create a PEX definition to use this single event-group, you are unable to run *tailored* collections in order to gather only the TRACE event data that is relevant to the problem your system is experiencing.

There are two primary reasons for collecting PEX TRACE data on a system:

1. IBM Support has asked you to run it.

 The intent is for the collected data to be sent to IBM for analysis. In this case, you should read Section 6.1, “Getting PEX TRACE for IBM Support Analysis of Data” in this redbook. All other sections in this chapter are not applicable.

2. You want to perform in-depth performance analysis using PEX TRACE.

 You are analyzing the collected trace data and you have a detailed understanding of AS/400 performance.

 In this case, proceed to Section 6.2, “Getting PEX TRACE for In-house Analysis of Data” on page 126. Do not read Section 6.1, “Getting PEX TRACE for IBM Support Analysis of Data.”

The following topics discuss these two uses of collected PEX TRACE data.

6.1 Getting PEX TRACE for IBM Support Analysis of Data

The data collected is sent to IBM Support for analysis and is not intended for in-house review. You do not need to have the Performance Tools/400 installed on your system in order to collect this type of data for IBM.

IBM Support explains what type of PEX TRACE data collection is needed. This collection, or grouping of event data, is one of the following data:

- PEX TRACE standard definition support available on every RISC-based OS/400.
- One of the *extended* base PEX TRACE definitions that is contained in PTF SF28949 (V3R6) and PTF SF33744 (V3R7) and is listed in Table 2 on page 126.

In this redbook, we refer to both the single set of events TRACE definition and the definitions available under PTF SF28949 or SF33744 as ″base″ PEX TRACE support. If you are asked to use one of these definitions and you are not sure if they are available on your system, enter the following command:

```
DSPFD FILE(QUSRSYS/QAPEXDFN) TYPE(*MBRLIST)
```

This displays a list of all available PEX definitions.

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The following table lists the PEX definitions shipped with PTFs SF28949 and 33744. Actually, one of these PTFs relates to PEX STATS and not PEX TRACE, providing a definition close to TPST.

Table 2. Extended PEX TRACE Definitions Shipped in PTF SF28949(V3R6), PTF 33744(V3R7)

Definition Name	Descriptions
QBUSYARM1	Trace mode, DASD start events
QBUSYARM2	Trace mode, DASD start, page fault start & SAR start events
QGENSYSP1	Trace mode, General system performance definition
QGENSYSP2	Trace mode, General system perf + mi exception
QGENSYSP3	Trace mode, General system perf + long seize wait
QGENSYSP4	Trace mode, Gen sys perf + seize/wait, exception
QMITRCEXT	Trace mode, call/return, activation group & mi exception
QTASKSWT	Trace mode, task switch in/out events
QTPST	Stats mode, TPST-like definition
QTRCASM	Trace mode, Auxiliary Storage Management events
QTRCPROFnn 1	System wide CPU profiler, nn millisecond intervals where nn=01,05,10 and 20

Note the following:

1 An example of how to use this definition is shown in Section 8.1, "What Programs are Using Most CPU on the System?" on page 189.

The PEX TRACE data collected using these definitions is not meant for analysis outside of IBM Software Support.

Follow the instructions supplied by IBM Support for collecting, saving, and sending the data to IBM.

6.2 Getting PEX TRACE for In-house Analysis of Data

In order to collect the most detailed performance data available using PEX TRACE, you first need to obtain *additional* commands that enable you to:

- Tailor the type of data collected (known as events) to the type of performance problem you want to investigate.
- Produce reports that are not available in either the Performance Tools/400 LPP or OS/400.

The advanced collection and reporting capability provided through these commands is collectively referred to throughout this document as **Enhanced PEX TRACE**.

This advanced collection and reporting capability is intended only for use by AS/400 customers, IBM Services Professionals, and Business Partners that are already experienced in performance investigation on the AS/400 system.

Notes:

1. First, you need to obtain the PEX TRACE additional commands and reports. Please refer to Section 6.3, “How to Get the Enhanced PEX TRACE Functions” on page 127 for instructions on how to proceed.
2. The Performance Tools/400 Licensed Program Product must be installed in order to use the Print PEX Report command, which is a necessary part of any PEX performance reporting,

6.3 How to Get the Enhanced PEX TRACE Functions

The Enhanced PEX TRACE collection and reporting functions are provided through a set of ″fake″ and real PTFs. The PTF mechanism has been chosen as the easiest method of delivery for making these functions immediately available. Some of the PEX TRACE PTFs listed in Table 3 on page 127 (V3R6) and and Table 4 on page 130 (V3R7) act only as containers for the enhanced PEX TRACE function. These PTFs do not change any system run-time routines and do not fix any system problems. These PTFs include two libraries:

- Library QYPINT:

 This library contains the PEX TRACE Main Menu (PEXTRC01) and the supporting commands to simplify the collection and reporting of detailed PEX TRACE data.

- Library SMTRACE:

 This library contains the reports (queries) over data collected using the PEX TRACE commands from the PEX TRACE Main Menu in library QYPINT.

Note

The real PTFs listed in Table 3 on page 127 and Table 4 on page 130 are current as of February 28, 1997. Please use DIAL IBM or speak to IBM Software Support for a list of the latest PEX or PDC PTFs, especially to determine PTF supersedes.

Table 3 (Page 1 of 4). V3R6 Extended/Enhanced PEX TRACE Function PTFs (Real and ″Fake″)

PTF Number	Library Name	Description of Contents
MA13057	QYPINT	A SAVLIB of library QYPINT. This contains a full-function ADDPEXDFN command and Enhanced PEX Trace menus PEXTRC01 and PEXTRC02. This includes the Storage Management Trace (SMTBCH) command that assists in defining a trace collection tailored to your collection requirements.

Table 3 (Page 2 of 4). V3R6 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")

PTF Number	Library Name	Description of Contents
MA13058	SMTRACE	Part one of 3 *SAVFs that contain the objects in library SMTRACE. This PTF and the following 2 PTFs (MA13059 and MA14450) must be restored as objects (RSTOBJ command) into library SMTRACE, which you must have previously created. The support contained here provides additional reports, queries, and data summaries to assist with the analysis of collected Enhanced PEX TRACE data. These reports are grouped according to the type of problem being investigated. For example, reports relating to page faulting are now available from the new Faults (FLTS) command on the new PEX Reports Menu PEXTRC02. **All three save files (*SAVF) must be restored for proper function.**
MA13059	SMTRACE	Part 2 of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
MA14450	SMTRACE	Part 3 of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
MF11593 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF12290 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF12309 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF09615 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10062 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10845 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10856 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10867 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10868 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF11015 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.

Table 3 (Page 3 of 4). V3R6 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")

PTF Number	Library Name	Description of Contents
MF14622 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF14447 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions. This PTF applies to PEX STATS HIER reports and removes the "*Alias" Call Level entry for ILE programs on the PRTPEXRPT report for a STATS HIER collection. When *Alias entries are *not included* in the report, Call Level values are as the programmer would expect them.
SF35974 to 5716-PT1	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions. This ensures that PRTPEXRPT command detail output prints *CPU milliseconds used* rather than CPU run cycles. **This PTF has been superseded by SF37834.** SF35974 is documented here since the cover letter to SF37834 does not describe the change to the CPU run cycle value.
SF37834 to 5716-PT1	--------	This is a real PTF. Make sure you have this PTF applied before running STATS and Enhanced PEX TRACE collection and reporting functions. It supersedes PTF SF35974 and adds support to disable the attempt to remove PEX data collection overhead from the total CPU utilized (applications and PEX overhead) during the collection time. Without this PTF, PEX STATS and PEX TRACE output may erroneously indicate program cumulative CPU utilization is greater than 100% or a program is shown as using less CPU utilization than it actually consumed and would then not appear towards the top of the report when sorted in descending cumulative CPU utilization order. With the PTF applied PEX overhead is not removed. You can tell this PTF (or its supersedes) has been applied if a Partition Section of a PRTPEXRPT report no longer shows *Overhead Removed* or *Total Raw CPU* values: `Total Raw CPU . . :  2756288 <- dropped` `Overhead Removed. :  220397 <- dropped` `Total CPU . . . . :  2535891 <- 2756288` `Task CPU. . . . . :  135184  05.3 %` `Job CPU . . . . . :  2400707  94.7 %` `----------` `Pgm/Mod CPU. . :  xxxxxxx  mm.m %` `Unknown CPU. . :  yyyyyyy  nn.n %` As of February 28, 1997, there is no projected availability date for a PTF to re-enable overhead removal. Please use the DSPPFM FILE(QAPZCOVER) MBR(QSF37834) to review full details.
SF35964 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF35964) to review the details.

Table 3 (Page 4 of 4). V3R6 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")		
PTF Number	**Library Name**	**Description of Contents**
SF29899 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF29899) to review the details.
SF28949 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF28949) to review the details. **This PTF provides the "extended standard PEX TRACE definitions"** described in Table 2 on page 126.
SF28154 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF28154) to review the details.

Table 4 (Page 1 of 2). V3R7 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")		
PTF Number	**Library Name**	**Description of Contents**
MA14697	QYPINT	A SAVLIB of library QYPINT. This contains a full-function ADDPEXDFN command and Enhanced PEX Trace menus PEXTRC01 and PEXTRC02. This includes the Storage Managemment Trace (SMTBCH) command that assists in defining a trace collection tailored to your collection requirements.
MA14698	SMTRACE	Part one of 3 *SAVFs that contain the objects in library SMTRACE. This PTF and the following 2 PTFs (MA14699 and MA14700) must be restored as objects (RSTOBJ command) into library SMTRACE, which you must have previously created. The support contained here provides additional reports, queries, and data summaries to assist with the analysis of collected Enhanced PEX TRACE data. These reports are grouped according to the type of problem being investigated. For example, reports relating to page faulting are now available from the new Faults (FLTS) command on the new PEX Reports Menu PEXTRC02. **All three save files (*SAVF) must be restored for proper function.**
MA14699	SMTRACE	Part 2 of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
MA14700	SMTRACE	Part 3 of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
SF33744 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF33744) to review the details. **This PTF provides the "extended standard PEX TRACE definitions"** described in Table 2 on page 126.
SF35321 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF35321) to review the details.

Table 4 (Page 2 of 2). V3R7 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")

PTF Number	Library Name	Description of Contents
SF38029 to 5716-PT1	-------	This is a real PTF. Make sure you have this PTF applied before running STATS and Enhanced PEX TRACE collection and reporting functions. It adds support to disable the attempt to remove PEX data collection overhead from the total CPU utilized (applications and PEX overhead) during the collection time. Without this PTF, PEX STATS and PEX TRACE output may erroneously indicate program cumulative CPU utilization is greater than 100% or a program is shown as using less CPU utilization than it actually consumed and would then not appear towards the top of the report when sorted in descending cumulative CPU utilization order. With the PTF applied PEX overhead is not removed. You can tell this PTF (or its supersedes) has been applied if a Partition Section of a PRTPEXRPT report no longer shows *Overhead Removed* or *Total Raw CPU* values: `Total Raw CPU . . :  2756288 <- dropped` `Overhead Removed. :  220397 <- dropped` `Total CPU . . . . :  2535891 <- 2756288` `Task CPU. . . . . :  135184  05.3 %` `Job CPU . . . . . :  2400707  94.7 %` `----------` `Pgm/Mod CPU. . :  xxxxxxx  mm.m %` `Unknown CPU. . :  yyyyyyy  nn.n %` As of February 28, 1997, there is no projected availability date for a PTF to re-enable overhead removal. Please use the DSPPFM FILE(QAPZCOVER) MBR(QSF38029) to review full details.
MF13355 to SLIC	-------	This is included in V3R7 GA code. No need to apply.
MF13420 to SLIC	-------	This is a real PTF.
MF14469 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF14263 to SLIC	-------	This is a real PTF.

Notes:

1. If you already have a library called SMTRACE on your system, please either rename it or save/delete it before restoring the V3R7 SMTRACE library from these PTFs.
2. The queries in library SMTRACE are contained within **three** PTFs.
3. Follow the instructions in the PTF cover letter for restoring the objects contained in these PTFs.

PEX PTFs Consideration

This chapter lists the ″extra PEX TRACE PTFs″ and the ″enhanced PEX TRACE PTFs.″ Over time, PEX PTFs for all PEX functions will become available. Appendix D, “Performance Explorer PTF Summary” on page 489 contains the list of all known PEX PTFs as of February 28, 1997.

6.4 How to Use Enhanced PEX TRACE

Important!

This section explains how to use the additional PEX TRACE functions obtained using the PTFs in Section 6.3, “How to Get the Enhanced PEX TRACE Functions” on page 127. If you do not have these PTFs and have not restored libraries QYPINT and SMTRACE to your system, please do so before continuing with this section.

In order to successfully run Enhanced PEX TRACE and produce Enhanced PEX TRACE reports, please read the following section. All functions are accessed from menu PEXTRC01 in library QYPINT.

6.4.1 PEX Trace Main Menu (PEXTRC01)

All collection and reporting commands are available from the PEX TRACE Main Menu (PEXTRC01) in library QYPINT. Therefore, in order to run Enhanced PEX TRACE, you should first enter:

1. ADDLIBLE QYPINT
2. ADDLIBLE QSMTRACE
3. GO PEXTRC01

The following menu is displayed:

```
PEXTRC01                    PEX Trace Main Menu
                                                        System:   SYSASROD
Select one of the following:
     1. Display Active PEX Session Name
     2. Start PEX Trace Data Collection
     3. End PEX Trace Data Collection
     4. PEX Trace Reports Menu
     5. Query Active PEX Session Status
     6. Display Collected PEX Session Names
     7. Display PEX Trace Run Information for a Session
     8. Display PEX Trace Run Time for a Session
     9. Work with Submitted Jobs
    10. Delete PEX Trace Session Data
Selection or command
===>_____________________________________________________
F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel
F13=Information Assistant  F16=AS/400 main menu
```

Figure 25. PEX Trace Main Menu

Before proceeding, please be aware that the actual command sequence you use is identical to PEX STATS and PEX PROFILE. We have, however, deliberately packaged these commands into a menu-driven interface to simplify ease-of-use

because extra steps are necessary to successfully collect data and produce reports using the Enhanced PEX TRACE Menu PEXTRC01.

Notes:

1. The actual Add PEX Definition Command used for this collection is different from the one provided as standard with OS/400 PEX.
2. Using the ADDPEXDFN command in library QYPINT is available through the PEX Main Menu, PEXTRC01. Using this command outside of the menu interface is not recommended **and is not supported**.

6.4.2 Displaying Active PEX Sessions

Prior to collecting any TRACE data, you should verify that there are no other PEX sessions (collections) currently active.

In order to do this, take option 1 from the PEX Main Menu. An example of the Display Active PEX Sessions display is shown:

```
                        Display Active PEX Sessions
          Session Name       Total Active Sessions =        1
          ITSOTRC1




                                                                      Bottom


 F3=Exit
```

Figure 26. Display Active PEX Session Name

If an active PEX session exists, it must be ended (using the ENDPEX command) before a new PEX TRACE session can be started.

In some situations, a PEX Session appears as active but the ENDPEX command fails (with message CPFAF06) indicating that the PEX session is **not** active. If this situation occurs on your system, you should use the WRKOBJ OBJ(QUSRSYS/*ALL) OBJTYPE(*USRSPC) command and delete the data area with the name that matches the PEX session showing as active.

Option 1 (Display Active PEX Session Name) uses a DSPOBJD command for a User Space object in library QUSRSYS to find if there is an active PEX session. This works on V3R6 and V3R7.

On V3R7, ENDPEX supports SSNID(*SELECT), which does the same function and, if an active session is found, lets you select it so it can be ended.

When there are no active PEX sessions, PEX TRACE data can be collected.

6.4.3 Collecting Enhanced PEX TRACE Data

Take option 3 on the PEXTRC01 Menu and the command Storage Management Trace in Batch (SMTBCH) is prompted. The following display is shown:

```
                        V3R6 VERSION OF SMTBCH (SMTBCH)
 Type choices, press Enter.
Definition/MBR name  . . . . . 1  __________ Name
Type of problem  . . . . . . . 2  __________ Name, *PERF, *DASDPERF1...
Length of trace in minutes . . 3  _______________
Maxdata to collect . . . . . . 4  500000____    1-2000000000
Library for collected data . . 5  QYPINT____    Character value
Min CPU sample (milliseconds)  .  200           10-2000
Trace MI CALL Events?  . . . . 6  *ENTEXTMI     *ENTRYEXIT, *MICMPLX...
Break MSG when time is up? . . A  N             Y, N
Submit job to batch? . . . . .    Y             Y, N
Job queue name . . . . . . . .    QCTL______    Name
Job queue library  . . . . . .    *LIBL_____    Name, *LIBL
Trace specific jobs/tasks? . . 7  N             Y, N
Convert Pex Trace Data?  . . . 8  N             Y, N
PRTPEXRPT & CPYSPLF to LIB?  . 9  N             Y, N
Job Priority for PRTPEXRPT . . 10 51            10-90

                                                                    Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 27. Start PEX Trace Data Collection

In the following notes section, you should use the **specific values that are recommended.** All values that are not explicitly mentioned in the notes section should be left as the default value.

The value you specify for PROBLEM is used to build a PEX TRACE definition that collects the **minimum** types of TRACE events necessary to enable report generation. The less events collected, the longer the TRACE can be run.

For some PROBLEM types, the MIBRACKET keyword is also used to determine which TRACE events should be collected. Please refer to each of the individual PROBLEM type keyword values shown in this document to determine the effect of the MIBRACKET keyword value.

Notes:

1 DFN Keyword (Definition/MBR name)

Try to use a member name representative of the date, type of TRACE collection, and sequence. For example, you can use:

0P0804A

where:
0P represents an OPENS type of collection.
0804 represents the day and month of the collection (April 8).
A indicates that it was the first collection of that type on that day.

2 PROBLEM Keyword (Type of problem)

Choose one of the problem types defined in the following list. If you have no idea what may be causing the performance problems, you should use *PERF.

Please refer to Table 13 on page 168 for details of what type of PEX TRACE data must be collected in order to run each of the PEX TRACE reporting commands.

- *PERF

 This choice causes collection of general PERFormance related data such that most of the subsequent reports may be produced. Use a short collection time for this problem type (5-10 minutes), as many events may be collected. For example, on a model 530 running at approximately 50% CPU utilization, we have seen 1 000 000 trace events collected per minute.

 This PROBLEM value is used together with the MIBRACKET keyword (Trace MI CALL Events?) value to determine which TRACE events to collect.

 Specify MIBRACKET(*ENTEXTMI) if you need to see program names in the reports (this, however, collects many more events than using *NONE).

- *DASDPERF1

 This choice causes collection of DASD events, read start and completion events, and write start and write completion events.

 The value specified against Trace MI Call Events (MIBRACKET) is ignored.

 This PROBLEM value causes the MIBRACKET value to be overridden to MIBRACKET(*NONE). Therefore, you do not see application program names in data collected using this value.

- *DASDPERF2

 This choice causes collection of DASD events, read start and completion events, and write start and write completion events. In addition, page fault events are collected along with SAR events.

 The value specified against Trace MI Call Events (MIBRACKET) is ignored.

 This PROBLEM value causes the MIBRACKET value to be overridden to MIBRACKET(*NONE). Therefore, you do not see application program names in data collected using this value.

- *ADDRESSES

 This choice enables you to see which programs are using a lot of temporary and permanent addresses. Use a long collection time for this problem type (60+ minutes).

 This PROBLEM value is used together with the MIBRACKET value to determine which TRACE events to collect.

- *BUSYDISK

 This choice enables you to see what activity is occurring per disk arm and what objects are being accessed by disk arm. Use a short collection time for this problem type (5-10 minutes).

 This PROBLEM value is used together with the MIBRACKET value to determine which TRACE events to collect.

- *DISKSPACE

 This option allows you to see the actual size (allocated size) of objects on disk. Use a long collection time for this problem type (60+ minutes).

This PROBLEM value is used together with the MIBRACKET value to determine which TRACE events to collect.

- *OPENS

 This choice causes collection of data relating to full file opens only.

 Use this option if you have a high synchronous non-database IO rate and need to determine whether the cause is a lot of full file opens. Use a short collection time for this problem type (5-10 minutes).

- *ACTGRP

 This choice causes collection of data relating to activation group creations only.

 Use this option if you have a high synchronous non-database IO rate and need to determine whether the cause is a lot of activation group creations.

 The value specified against Trace MI Call Events (MIBRACKET) is ignored.

 This PROBLEM value causes the MIBRACKET value to be overridden to MIBRACKET(*ENTEXTMI). This is done so that both application program names and appropriate MI Complex Instruction names are collected.

- *JOBWAITS1

 This is a V3R7 choice that collects base events relative to task switching along with DASD events for read and write starts and completions.

 The value specified against Trace MI Call Events (MIBRACKET) is ignored.

 This PROBLEM value causes the MIBRACKET value to be overridden to MIBRACKET(*NONE). Therefore, you do not see application program names in data collected using this value.

- *DEACTS

 This value enables you to investigate OPM and ILE program activations and deactivations. If you have use another tool such as Performance Monitor Trace and determine high usage CPU programs, use this value to check whether these programs are:

 – OPM or ILE compatibility mode programs fully terminating on each call that are repetitively called by individual jobs.
 – ILE programs causing heavy activation group create/delete activity. These may involve incorrect usage of the RCLACTGRP command or inappropriate use of the ″end run unit″ support.

 Programming techniques causing unnecessary program activation and activation group creations should be **avoided**; it is expensive in terms of CPU to activate a program (with static storage) and create or delete an activation group.

 The value specified against Trace MI Call Events (MIBRACKET) is ignored.

 This PROBLEM value causes the MIBRACKET value to be overridden to MIBRACKET(*ENTEXTMI). This is done so that both application

program names and appropriate MI Complex Instruction names are collected.

3 DURATION Keyword (Length of trace in minutes)

Use a value of 5 (representing 5 minutes) or more. It represents the elapsed trace time before the collection ends.

We suggest that for SMTBCH PROBLEM types of *PERF, *OPENS, *ACTGRP *DASDPERF1, *DASDPERF2, *JOBWAITS1, and *DEACTS, you consider using a value of 5-10 minutes; for SMBTCH PROBLEM types of *ADDRESSES, *BUSYDISK, and *DISKSPACE, consider using a longer value such as 30-60 minutes.

4 MAXDATA Keyword (Maxdata to collect)

500000 is the default amount of space in K bytes to store PEX TRACE event data. This allocates DASD space to record the trace data and should be sufficient for as long as a TRACE collection should be run. You can assume 80 bytes per trace event; therefore, 500000K gives approximately 500000 x 1024 / 80 = 6 400 000 events.

5 DATALIB Keyword (Library for collected data)

If you specify a library name other than QYPINT, the library is created if it does not already exist.

6 MIBRACKET Keyword (Trace MI CALL Events?)

Use only one of two values against this keyword:

- *NONE

 Use this value if you do not want to see application program names in any of the PEX Reports. This means that you do not get application program names in any PEX reports produced from a command that has **REQUIRES MI CALL TRACE on it. Refer to Chapter 10, “Examples of PEX TRACE Reports” on page 249 for more information on PEX TRACE reports that can be produced.

 On a system performing many call/returns, the number of events collected to show the call/return of programs is high. Consider using the value of *NONE the first time you collect data using SMTBCH .. PROBLEM(*PERF) for general performance analysis.

- *ENTEXTMI

 Use this value if you want to see application program names in your PEX reports.

 This option causes more data to be collected than *NONE, however, all PEX reports for the problem type you are investigating can now be produced.

 On a busy system, significantly more trace events are collected using this value; therefore, you should limit the collection time to 5-10 minutes when you use this value.

7 ADDJOBS Keyword (Trace specific jobs/tasks?)

The default of N (no) ensures that you are tracing all jobs on the system.

Use Y if you want to enter an individual job name/user/number to be traced; this causes a lower collection overhead than ADDJOBS(N).

IBM Support: please note that this keyword is ignored when the PROBLEM type is *DEFN.

8 CVTPEX Keyword (Convert Pex Trace Data?)

If you specify PRTPEX(Y), this keyword is ignored.

By default (N), when PEX TRACE collection data is dumped at the end of a collection as specified in the DURATION keyword, it is collected into a single binary file that contains multiple members. The intent is to minimize the amount of disk storage until it needs to be analyzed. You can take this data to a remote location and run the QYPINT/CVTPEXDTA command over the single file to produce the QAYPExxxx database files that PRTPEXRPT requires to function correctly.

By specifying CVTPEX(Y), the set of QAYPExxxxx files expected by the PRTPEXRPT command is produced when the PEX collection is ended based on the DURATION keyword. The single binary file with multiple members is not produced.

9 PRTPEX Keyword (PRTPEXRPT & CPYSPLF to LIB?)

Specify PRTPEX(N) if you do not want the PRTPEXRPT command to be automatically run and do not want to produce any of the Enhanced PEX TRACE reports.

Use PRTPEX(Y) to ensure that the data is dumped to the PEX QAYPExxxxx files and the PRTPEXRPT command is automatically run.

PRTPEX(Y) causes the value specified against CVTPEX to be ignored. We recommend that you use CVTPEX(N) PRTPEX(N) if you want to produce a single binary, multi-member file and take it to a **different system** to produce reports. We recommend that you use CVTPEX(Y) PRTPEX(Y) to produce the QAYPExxxxx PEX files and automatically run the PRTPEXRPT command for subsequent Enhanced PEX TRACE reporting on the **same system**.

10 PRTPEXPTY keyword (Job Priority for PRTPEXRPT)

This keyword is only used if PRTPEX(Y) is specified. It ensures that, after data collection has completed and the data has been dumped to the QAYPExxxxx files, the PRTPEXRPT command is run at the specified priority (the default is priority 51) and **not** at the priority of the collection job (which is priority 10).

A BREAKMSG keyword (Break MSG when time is up?)

Normally you specify N (No) for this keyword, permitting the PEX Enhanced TRACE to complete without operator intervention. If you want to be prompted when the trace collection has been completed you can specify Y. If Y is specified, a QSYSOPR reply message is sent when the trace collection completes. The operator must respond with one of these

options: F=end the trace and dump the data into a single file (ENDPEX OPTION(*END) DATOPT(*FILE)), E=end the trace and discard the collected data (ENDPEX OPTION(*END) DATOPT(*DLT)), R=discard the data and restart the collection, or D=end the trace and dump the collected data into the session name members ((ENDPEX OPTION(*END) DATOPT(*LIB)) as shown in the following display:

```
 Message ID . . . . . :   CPF9898       Severity . . . . . :   40
 Message type . . . . . :   Inquiry
 Date sent  . . . . . :   02/11/97      Time sent  . . . . . :   17:25:55

 Message . . . . :   PEXTRACE: F=dump      data and end trace, *FILE option,
   E=Discard data and end trace,      R=Discard data and restart trace, D=Dump
   data and end trace, *LIB option.
 Cause . . . . . :   This message is used by application programs as a general
   escape message.

                                                                       Bottom
Type reply below, then press Enter.
Reply  . . . . D_____________________________________________________

F3=Exit   F6=Print   F9=Display message details
F10=Display messages in job log   F12=Cancel   F21=Select assistance level
F12=Cancel
```

You can run the Storage Management Trace interactively but the default is to run the functions in batch, submitting the job to subsystem QCTL, just as the Start Performance Monitor (STRPFRMON) command defaults to subsystem QCTL. We recommend running in batch.

The SMTBCH command performs the following functions:

1. **Add a PEX Definition (ADDPEXDFN)**:

 This definition is tailored to the type of problem you want to analyze. Thus, if you use problem type of Full Opens (*OPENS) and later run the Activation Group reports over this collection, there is no data in the reports because activation group PEX event data was not collected.

 The name of the definition added is set to the member name you specify on the SMTBCH command. If a definition already exists with this name, **it is replaced**.

2. **Start a PEX Data Collection (STRPEX)**:

 PEX TRACE collection is collected using a definition name the same as the member name you specified on the SMTBCH command.

 This collection runs for the period (in minutes) specified on SMTBCH, collecting the maximum amount of trace events specified on the SMTBCH command. If the specified number of maximum trace events is reached before the elapsed trace time is reached, PEX TRACE stops the collection.

 You can also end the trace at any time using Option 3 (End PEX Trace Data Collection) on the PEXTRC01 menu.

3. **End a PEX Data Collection (ENDPEX)**:

 Collection automatically ends after either the elapsed trace time is reached or the maximum number of trace events is reached.

 The SMTBCH command always runs ENDPEX .. OPTION(*LIB), which dumps the data to the PEX TRACE files described in the PEX Chapter of *Performance Tools/400*, SC41-4340.

Please refer to Figure 28 on page 140 for details on how to prematurely end PEX TRACE collection.

4. **Print PEX Report for Collected Data (PRTPEXRPT)**:

 This command is run as part of the SMTBCH command if you specified Y for the PRTPEX prompt. It causes the standard PRTPEXRPT command to be run for TRACE data in TASK sequence. It is run at the priority specified for PRTPEXPTY on the SMTBCH command (the default is 51).

5. **Prepare PRTPEXRPT output for Further Analysis**:

 This step happens only if you specified Y for the PRTPEX prompt on the SMTBCH command. The spooled file resulting from running the PRTPEXRPT (QPVPERPT) command is copied to database file PF132. The member name is the same member name specified for the DFN keyword on the SMTBCH command. The library is the same as the library specified for the DATALIB keyword on the SMTBCH command. The PF132 file is used as input for all of the reporting commands in library SMTRACE.

 The QPVPERPT spooled file produced by the PRTPEXRPT command is deleted; it can be large and its contents cannot be easily interpreted outside of IBM Software Support.

6.4.4 End Enhanced PEX TRACE Data Collection

Take option 3 on the PEXTRC01 menu if you need to end Enhanced PEX TRACE collection before the elapsed trace time specified on the SMTBCH command is reached. Use this option if you need to:

- Have PEX TRACE data saved in a single file (in binary) for sending to IBM for analysis.
- Stop PEX TRACE collection and not save the data because the problem you are investigating did not occur.
- Stop PEX TRACE collection prematurely because you know that the problem you are investigating has occurred; therefore, you do not need to collect further data.

If you end PEX collection using this command, the following display is shown:

```
                          END SMTBCH CMD (ENDSMTBCH)
Type choices, press Enter.
End SMTBCH . . . . . . . . . . 1 _________  *END, *DUMP, *FILE, *RESTART




                                                                      Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 28. End PEX Trace Data Collection

Notes:

1 Specify whether you want to keep the PEX TRACE data collected or not by using:

- *DUMP

Use this value to stop collecting data and place (dump) the collected data into the PEX TRACE files in the library specified on the SMTBCH command. If these files do not already exist in this library, they are created by this command.

Use this value to perform the same function as ENDPEX..OPTION(*END) DTAOPT(*LIB).

Use this option when analysis of the data is performed on your system. If you are sending the data back to IBM for analysis, we recommend you use the *FILE option.

When this option is taken, there are a few moments before collection ends if the SMTBCH command is being run in batch. This is usual, because the ENDSMTBCH command is communicating with the job running the SMTBCH command through a data queue.

- *END

 Use this value to stop collecting data because the problem you are trying to capture has not occurred. Data is not placed into the PEX TRACE files using this option.

 Use this value to perform the same function as ENDPEX..OPTION(*END) DTAOPT(*DLT).

- *FILE

 All of the collected performance data for the session is stored in a single physical file named, by default, to match the collection session. Use this option if the collected information is sent to IBM for analysis or if you do want to produce the reports on a different system. This performs the same function as ENDPEX OPTION(*FILE) and means that there is only one file object to be saved rather than an entire PEX data library. The *FILE option is also available on the SMTBCH command directly, by specifying CVTPEX(N) PRTPEX(N).

 Note that after using *FILE, it is necessary to:

 1. Run the QYPINT/CVTPEXDTA command to expand the single file into the PEX QAYPExxxxx files.
 2. Run the PRTPEXRPT command.

 before running the Enhanced PEX TRACE reports.

- *RESTART

 We recommend that you do not use this option. It is provided for IBM Software Support use only.

6.4.5 Enhanced PEX TRACE Reports Menu

Take option 4 on the PEXTRC01 menu to access the Reports Menu (PEXTRC02).

The options available from the following menu are described in Section 6.6, “PEX TRACE Reports Menu” on page 145 For examples of the reports produced from this menu, please refer to Section 7.4, “How Does the Enhanced PEX TRACE Differ?” on page 178.

```
PEXTRC02                    PEX Trace Reports Menu
                                                          System:   SYSASROD
Select one of the following:
     1. Full File Opens
     2. Physical Disk IOs
     3. Activation Group Creates
     4. Faults
     5. Disk Space Consumption
     6. Address Consumption
     7. Size of Objects Used During PEX Trace Collection
     8. CPU Utilization
     9. Program Activations and Deactivations


Selection or command
===>
F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel
F13=Information Assistant  F16=AS/400 main menu
```

Figure 29. PEX Trace Reports Menu

6.4.6 Query Active PEX Session Status

Access this command with Option 5 of the PEXTRC01 menu to display the number of trace events collected by the specified active PEX session. The prompt for the active PEX session name is shown in the following display:

```
                          QUERY PEX SESSION (QRYPEX)
Type choices, press Enter.
SESSION  . . . . . .  _______       Name









                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 30. Query Active PEX Session Status

Enter the name of the active PEX session in which you are interested. If you cannot remember the name of the PEX session, go back to the Enhanced PEX Main Menu, PEXTRC01, and take option 1.

The current status of the collection is shown on the status line of the display, similar to the following example.

```
Session: DHPERF4  Mode: *TRACE  State: ACTIVE  Event count: 4274.
```

6.4.7 Display Collected PEX Session Names

Accessed with Option 6 of the PEXTRC01 menu, this option displays the names of all existing PEX TRACE collections.

Use this option to determine what the collection names are in the specified library. Subsequently, you can produce reports for these collections or delete them. Displays similar to the following display are shown:

```
                    Display PEX Trace Sessions (DSPTRCCOL)
Type choices, press Enter.
PF132 and PEX file library . . .   __________     Name




                                                                      Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 31. Display Collected PEX Session Names

Type the PEX data library name on the previous display and press Enter for a display similar to the following one to be shown.

```
                          Display PEX Session Names
          Session Name    Total Number of Sessions =       16
          ACTGRP1
          ACTGRP2
          ACTPGM1
          AGNEW
          ALLX2
          ALLX3
          ALL1
          ALL1X
          EX1
          EX2
                                                                More...


 F3=Exit
```

Figure 32. Example - Collected PEX Trace Session Names

6.4.8 Display PEX TRACE Run Information for a Session

Take option 7 on the PEXTRC01 menu to determine the following information for a session:

- Start time and date
- Stop time and date
- USERID performing the collection
- Number of jobs and tasks involved in the collection
- Number of PEX TRACE events collected
- Number of PEX TRACE missed during collection
- Seconds for which collection was suspended

Take option 8 on the PEXTRC01 menu to display the run time in seconds for an existing Enhanced PEX TRACE collection.

Enter the PEX collection name and PEX data library name on the following display.

Complete the following display by providing the Enhanced PEX TRACE session (member) name and the PEX data library name.

```
                    Display Trace Run Information (DSPRUNINF)
Type choices, press Enter.
PF132 and PEX files mbr name . .   _______       Name, *FIRST
PF132 and PEX file library . . .   __________    Name
Submit as batch job? . . . . . .   *NO           *YES, *NO

                                                                      Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 33. Display PEX Trace Run Information for a Session

Information similar to the following example is either displayed or produced in the query spooled file, QPQUPRFIL.

```
07/31/96  10:03:06                          PEX TRACE Run Information                                PAGE    1
Collection Creation Creation Started  Start    Stop      Number of   Total          Total             Total
name       Date     Time     by user  Time     Time      Jobs/Tasks  Suspended      events            Missed
                                                                     Secs                             Events
DEACTO2    07/30/96 14:32:25 A960123A 14:32:25 14:34:11         328          0       3,110                  0
```

Figure 34. Example: Display PEX Trace Run Information for a Session

6.4.9 Display PEX TRACE Run Time for a Session

```
                       Query Active Trace Time (PEXTRCSEC)
Type choices, press Enter.
PF132 and PEX files mbr name . .   *FIRST        Name, *FIRST
PF132 and PEX file library . . .   __________    Name




                                                                      Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 35. Display PEX Trace Run Time for a Session

Once you have selected the session name and Library name, a message similar to the following one is shown at the bottom of the PEXTRC01 menu.

```
Run time for trace session ITSOTST in library ITSOLIB is 000000258 seconds
```

The run time is also written to a member name equal to the collection name in file TRACESEC in the same PEX data library. This is provided so that users can develop their own queries to determine the rate per second for chosen events.

6.4.10 Work with Submitted Jobs

Option 9 from the PEXTRC01 menu runs the command:

```
WRKSBMJOB SBMFROM(*JOB)
```

This enables review of the status of any PEX TRACE commands run in batch submitted from this job.

6.4.11 Delete PEX TRACE Session Data

Use option 10 on the PEXTRC01 menu to delete PEX TRACE data. It is important that PEX data is regularly deleted from the system because it can take up a considerable amount of disk space.

This command uses the Delete PEX Data (DLTPEXDTA) command to delete the PEX Session from all PEX data collection-related files described in Chapter 12 of the *Performance Tools/400* Manual. It also removes the specified Enhanced PEX TRACE collection data from the additional files:

- SMTRMOD
- TASKINFO
- PF132
- TRACESEC

These are used as part of the Enhanced PEX Main Menu (PEXTRC01) function and Enhanced PEX Reports Menu (PEXTRC02) function.

The following display is shown:

```
                        Cleanup PEX Data (CLNPEXDTA)
Type choices, press Enter.
PF132 and PEX files mbr name . .   _______      Name, *FIRST
PF132 and PEX file library . . .   __________   Name
Submit as batch job? . . . . . .   *YES         *YES, *NO




                                                                      Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 36. Delete PEX Trace Session Data

Note that this command is not named DLTPEXDTA; it deletes data from the additional Enhanced PEX files not handled by the DLTPEXDTA command.

6.5 PEX TRACE Reports

The reports described in this section are available only if you have collected PEX TRACE data using the PEX Main Menu PEXTRC01 Option 2.

6.6 PEX TRACE Reports Menu

Each of the options on this menu runs a particular reporting command.

Once PEX data collection has finished, Table 13 on page 168 shows which reporting commands can be run for each of the SMTBCH problem types.

The enhanced PEX TRACE Reports Menu is now shown.

```
PEXTRC02                    PEX Trace Reports Menu
                                                        System:   SYSASROD
Select one of the following:
1  1. Full File Opens
2  2. Physical Disk IOs
3  3. Activation Group Creates
4  4. Faults
5  5. Disk Space Consumption
6  6. Address Consumption
7  7. Size of Objects Used During PEX Trace Collection
8  8. CPU Utilization
9  9. Program Activations and Deactivations


Selection or command
===>_____________________________________________________________
F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel
F13=Information Assistant  F16=AS/400 main menu
```

Figure 37. PEX Trace Reports Menu

The commands run by these options are:

1 OPENS Command

This command is shown in Section 6.6.1, “OPENS Reporting Command” on page 147.

2 IOS Command

This command is shown in Section 6.6.2, “IOS Reporting Command” on page 149.

3 ACTGRP Command

This command is shown in Section 6.6.3, “ACTGRP Reporting Command” on page 153.

4 FLTS Command

This command is shown in Section 6.6.4, “FLTS Reporting Command” on page 155.

5 NETSIZE Command

This command is shown in Section 6.6.5, “NETSIZE Reporting Command” on page 157.

6 ADDR Command

This command is shown in Section 6.6.6, “ADDR Reporting Command” on page 160.

7 OBJSIZE Command

This command is shown in Section 6.6.7, “OBJSIZE Reporting Command” on page 161.

8 PRTPEXCPUB Command

This command is shown in Section 6.6.8, “CPU Reporting Command” on page 162.

8 DEACTS Command

This command is shown in Section 6.6.9, “DEACTS Reporting Command” on page 163.

Options on each of these commands are explained in the following sections.

6.6.1 OPENS Reporting Command

Use this option to see, at a job level, which files are being fully opened multiple times.

Application program names only appear on the OPENS reports if you:

1. Specify *ENTEXTMI as the value for the MIBRACKET keyword on the SMTBCH trace collection command with PROBLEM type of *PERF.

 If you specify PROBLEM(*OPENS), the MIBRACKET value is ignored and application program information is always collected.
2. Specify Y for *Program Call Data* on the OPENS command.

```
                          Query FULL FILE OPENS (OPENS)
Type choices, press Enter.
PF132 and PEX files mbr name . .   *FIRST  1   Name, *FIRST
PF132 and PEX file library . . .   _______  2   Name
Delete query files created?  . .   *YES    3   *YES, *NO
Submit as batch job? . . . . . .   *NO     4   *YES, *NO
Force rescan of PF132 mbr? . . .   *NO     5   *YES, *NO
Type of Opens  . . . . . . . . .   *DB     6   *ALL, *DB, *NDB
Program Call Data (ENT/EXIT)?  .   *NO     7   **REQUIRES MI CALL TRACE

                                                                      Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 38. Query Full File Opens

Notes for OPENS command:

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Leave this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

5 Leave this value to default to *NO.

6 Do you want to investigate All opens, Database-only opens, or non-database-only opens? If unsure, use *ALL, otherwise choose one of the following values:

***ALL** All full opens resulting from database files, communication files, display files, and spooled files.
***DB** Database file full opens only.
***NDB** All full opens, excluding those for database files.

7 Application program names are in the TRACE data if you ran the collection using the SMTBCH command with one of the following options:

1. PROBLEM(*PERF) MIBRACKET(*ENTEXTMI)
2. PROBLEM(*PERF) MIBRACKET(*ENTRYEXIT)
3. PROBLEM(*OPENS)

Use *YES to print application program names in the reports **if you collected them** using one of the previous options.

If you do not want application program level detail, or you did not collect this information, use *NO.

The following table provides a high level view of the reports available using this command. Section 10.1, “Full File Opens (OPENS Command)” on page 249 provides examples of all the reports available from this command.

Table 5. Full File Opens (OPENS Command)

First Level of Detail	Second Level of Detail
JOB - See Section 10.1.1, “Report Title - Percent xxx Full Opens by Job” on page 250.	JOB/FILE - See Section 10.1.3, “Report Title - Full xxx Opens by File within Job” on page 251. JOB/PROG - See Section 10.1.4, “Report Title - Percent Full xxx Opens by Program within Job” on page 251. JOB/PROG/FILE - See Section 10.1.5, “Report Title-Percent Full xxx Opens by File within Program within Job” on page 252.
FILE - See Section 10.1.2, “Report Title - Percent Full xxx Opens by File” on page 250.	FILE/PROG - See Section 10.1.7, “Report Title - Percent Full xxx Opens by Program within File” on page 253. FILE/PROG/JOB - See Section 10.1.9, “Report Title - Percent Full xxx Opens by Job within Program within File” on page 254.
PROG - See Section 10.1.8, “Report Title - Percent Full xxx Opens by Program” on page 253.	PROG/FILE - See Section 10.1.6, “Report Title - Percent Full xxx Opens by File within Program” on page 252. PROG/FILE/JOB - See Section 10.1.10, “Report Title - Detail Full xxx Opens” on page 254.

Note:

```
Acronyms              Description
**************************************************************************
FILE    - File name.  This may be a database or non-database file.
JOB     - Qualified Job name
PGM     - Program name.  This may be a user program, IBM system program,
          or System Licensed Internal Code program.
```

6.6.2 IOS Reporting Command

Use this option to see what physical disk I/O is occurring at both a summary and detail level. These reports provide more detail on physical disk I/O than any other performance reports available. As an example of the level of detail, you can produce a report showing PDIO (physical disk I/O) by type (read, write, synchronous, asynchronous) for object by program within job.

```
                          Query physical I/Os (IOS)
Type choices, press Enter.
PF132 and PEX files mbr name . .   *FIRST  1     Name, *FIRST
PF132 and PEX file library . . .   _______ 2     Name
Delete query files created?  . .   *YES    3     *YES, *NO
Submit as batch job? . . . . . .   *NO     4     *YES, *NO
Force rescan of PF132 mbr? . . .   *NO     5     *YES, *NO
By Job/Task name and I/O type  .   N             Y, N
By Job/Task name and obj name  .   N             Y, N
By Job/Task name and disk unit     N             Y, N
By Job/Task name + mstore pool     N             Y, N
Objects with 100+ I/Os . . . . .   N       6     Y, N
By object and Job/Task name  . .   N             Y, N
By object and disk unit  . . . .   N             Y, N
Fault reads by Job/Task  . . . .   N             Y, N
Fault reads by Job/Task, obj . .   N             Y, N
Objects with 100+ fault reads  .   N             Y, N
Fault reads by obj, job/task . .   N             Y, N
                                                                    More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 39. Query Physical I/Os - Display 1 of 2

```
                          Query physical I/Os (IOS)
Type choices, press Enter.
By unit (arm)  . . . . . .   N             Y, N
By unit (arm) and Job/Task . . .   N             Y, N
By unit (arm) and object . . . .   N             Y, N
By mainstore pool  . . . . . .   N             Y, N
By pool and Job/Task . . . . . .   N             Y, N
By pool and object . . . . . .   N             Y, N
By object/segment type . . . . .   N             Y, N
By **pgm . . . . . .   N  7          Y,N **REQUIRES MI CALL TRACE
By job/**pgm/objname . . . . . .   N  7          Y,N **REQUIRES MI CALL TRACE
By job/**pgm/objtype . . . . . .   N  7          Y,N **REQUIRES MI CALL TRACE
By **pgm/objtype . . . . . .   N  7          Y,N **REQUIRES MI CALL TRACE

                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 40. Query Physical I/Os - Display 2 of 2

Notes for IOS command:

Select only reports that are necessary; producing all reports available on this command takes both a long time and produces a large amount of output to analyze.

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Leave this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

5 Leave this value to default to *NO.

6 Take Y for this option if you want to investigate SETOBJACC candidates, communication files, display files, and spooled files.

7 Application program names are in the TRACE data if you ran the collection using the SMTBCH command with one of the following options:

1. PROBLEM(*PERF) MIBRACKET(*ENTEXTMI)
2. PROBLEM(*PERF) MIBRACKET(*ENTRYEXIT)
3. PROBLEM(*BUSYDISK) MIBRACKET(*ENTEXTMI)
4. PROBLEM(*BUSYDISK) MIBRACKET(*ENTRYEXIT)

Use *YES to print application program names in the reports **if you collected them** using one of the previous options.

If you do not want application program level detail, or you did not collect this information, use *NO.

The following table provides a high level view of the reports available using this command. Section 10.2, “Physical Disk I/Os (IOS Command)” on page 255 provides examples of all the reports available from this command.

Table 6 (Page 1 of 2). Physical Disk I/Os (IOS Command)	
First Level of Detail	**Second Level of Detail**
IOTYP - See Section 10.2.1, “Report Title - DASD I/Os - System Wide Summary by I/O Type” on page 255.	None.
JOB - See Section 10.2.2, “Report Title - DASD I/Os by Job/Task Name and I/O Type” on page 256.	JOB/OBJNAM/OBJTYP - See Section 10.2.3, “Report Title - DASD I/Os by Job/Task and Object Name/Type” on page 257. JOB/ARM - See Section 10.2.4, “Report Title - DASD I/Os by Job/Task and Dasd Unit (Arm) Number” on page 267. JOB/POOL - See Section 10.2.5, “Report Title - DASD I/Os by Job/Task and Mainstore Pool Number” on page 271. JOB/FLTIO - See Section 10.2.9, “Report Title -Page Fault DASD Read I/Os by Job/Task Name and I/O Type” on page 291. JOB/OBJNAM/FLTIO - See Section 10.2.10, “Report Title - Page Fault DASD Read I/Os by Job/Task and Object Name/Type” on page 292. JOB/PGM/OBJNAM - See Section 10.2.21, “Report Title - I/O by Object Name within Program within Job” on page 328. JOB/PGM/OBJTYP - See Section 10.2.22, “Report Title - I/O by Object Type within Program within Job” on page 343.
ARM - See Section 10.2.13, “Report Title - Physical I/Os by Disk Unit (Arm) Number” on page 298.	ARM/JOB - See Section 10.2.14, “Report Title - Physical Disk I/Os by Unit (Arm) and Job” on page 300. ARM/OBJNAM - See Section 10.2.15, “Report Title - Physical Disk I/Os by Unit (Arm) and Object” on page 305.
POOL - See Section 10.2.16, “Report Title - Physical I/Os by Mainstore Pool” on page 311.	POOL/JOB - See Section 10.2.17, “Report Title - Physical Disk I/Os by Mainstore Pool and Job/Task” on page 312. POOL/OBJNAM - See Section 10.2.18, “Report Title - Physical Disk I/Os by Mainstore Pool and Object Name” on page 315.

Table 6 (Page 2 of 2). Physical Disk I/Os (IOS Command)

First Level of Detail	Second Level of Detail
OBJTYP - See Section 10.2.19, “Report Title - I/O by Object Type” on page 320.	OBJNAM/OBJTYP >100 I/O - See Section 10.2.6, “Report Title - Objects with 100 or More DASD I/Os” on page 273. OBJ/JOB/IO - See Section 10.2.7, “Report Title - DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task Name and I/O Type” on page 276. OBJNAM/OBJTYP/ARM - See Section 10.2.8, “Report Title - DASD I/Os by Object Name/Type and Disk Unit Number” on page 285. OBJ >100 FLTIO - See Section 10.2.11, “Report Title - Objects with 100 or More Page Fault DASD Read I/Os” on page 294. OBJ/JOB/FLTIO - See Section 10.2.12, “Report Title - Page Fault DASD Read I/Os for Objects with 1% or More of All Page Fault Reads” on page 296.
PGM - See Section 10.2.20, “Report Title - Program I/O Type Detail” on page 323.	PGM/OBJTYP - See Section 10.2.23, “Report Title - I/O by Object Type within Program” on page 352.

Note:

```
Acronyms               Description
**********************************************************************
ARM     - Disk Unit number
FLTIO   - Count of number of Page Faults that resulted in a disk read
          input operation
IO      - Count of number of DISK Input Output operations
IOTYP   - Type of DISK Input Output operation.
          The IO Types are documented in Table 16 on page 233.
JOB     - Qualified Job name
OBJDESC - Object Description or where the Virtual address segment does
          not address an object or part of an object, this field gives
          the description of the segment type.
OBJNAM  - Object Name.  Not necessarily a program object.
OBJTYP  - Two-digit object type followed by two-digit object subtype.
          The two-digit object type codes are documented in Table 17 on page 246.
          For further information, refer to the
          OS/400 Diagnostic Aids Manual, Volume 1, LY44-4907.
POOL    - Main Storage Pool Number
PGM     - Program name.  This may be a user program, IBM system program,
          or System Licensed Internal Code program.
```

6.6.3 ACTGRP Reporting Command

Use this command to determine if any ILE programs are causing excessive activation group creation/deletion, which is CPU intensive.

This is the only tool that clearly indicates the ILE application program name responsible for excessive activation group create/delete activity.

The value you specify against MIBRACKET is not used by the SMTBCH command when PROBLEM (*ACTGRP) is specified. The actual value used is

always set to MIBRACKET(*ENTEXTMI) so that both application program names and appropriate MI complex instructions are collected in the TRACE data.)

```
                      Activation Group Details (ACTGRP)
Type choices, press Enter.
PF132 and PEX files mbr name . .   *FIRST  1    Name, *FIRST
PF132 and PEX file library . . .   _______  2    Name
Delete query files created?  . .   *YES    3    *YES, *NO
Submit as batch job? . . . . . .   *NO     4    *YES, *NO
Force rescan of PF132 mbr? . . .   *NO     5    *YES, *NO



                                                                  Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 41. Query Activation Group Creations

Notes for ACTGRP command:

This command should only be used if you ran the collection using the SMTBCH command with one of the following options:

1. PROBLEM(*PERF) MIBRACKET(*ENTEXTMI)
2. PROBLEM(*ACTGRP)
3. PROBLEM(*DEACTS)

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Leave this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

5 Leave this value to default to *NO.

The following table provides a high level view of the reports available using this command. Section 10.3, “Activation Group Details (ACTGRP Command)” on page 361 provides examples of all the reports available from this command.

Table 7 (Page 1 of 2). Activation Group Details (ACTGRP Command)

First Level of Detail	Second Level of Detail
JOB - See Section 10.3.1, “Report Title - Activation Group Creates by Job” on page 361.	JOB/PGM - See Section 10.3.2, “Report Title - Activation Group Creates by Program within Job” on page 361.

Table 7 (Page 2 of 2). Activation Group Details (ACTGRP Command)	
First Level of Detail	**Second Level of Detail**
PGM - See Section 10.3.3, “Report Title - Activation Group Creates by Program” on page 362.	

Note:

```
Acronyms               Description
**********************************************************************
JOB     - Qualified Job name
PGM     - Program name.  This may be a user program, IBM system program
          or System Licensed Internal Code program.
```

6.6.4 FLTS Reporting Command

Use this command to see both a summary and the detail of faults occurring on the system. Faults are a natural occurrence on the AS/400 system because they are the mechanism that causes certain resources that are not in main storage to be brought into main storage. However, high fault rates in memory pools or against individual objects may indicate a problem. Refer to *AS/400 Work Management*, SC41-4306, for page fault guidelines.

Important Disk I/O Counting Information!

The total faults shown on these reports may be less than the total fault count using a different performance measurement tool, such as the Performance Monitor. Program names are not available on the physical disk I/O events; they are found by ″pairing″ the physical disk I/O for the fault to the event causing the physical disk I/O (event type SAR) where the program name is available. **Only physical disk I/O fault events where this matching has occurred are counted in these reports.** The number of unpaired fault events (the physical I/O cannot be paired with its matching SAR event to find the program name) is shown in the job log.

Add the number of unpaired faults found in the job log to the total system faults shown in these reports in order to get the same fault count found using tools such as the WRKSYSSTS command or the Performance Monitor.

```
                          Page faulting info (FLTS)
Type choices, press Enter.
PF132 and PEX files mbr name . .   *FIRST  1    Name, *FIRST
PF132 and PEX file library . . .   _______  2    Name
Delete query files created?  . .   *YE     3    *YES, *NO
Submit as batch job? . . . . . .   *NO     4    *YES, *NO
Force rescan of PF132 mbr? . . .   *NO     5    *YES, *NO
By object/segment name . . . . .   N           Y, N
By object and job/task . . . . .   N           Y, N
By job/task  . . . . . . . . . .   N           Y, N
By job/task and object/seg . . .   N           Y, N
By mainstore pool  . . . . . . .   N           Y, N
By MI PGM  . . . . . . . . . . .   N           Y, N
By SLIC PGM  . . . . . . . . . .   N           Y, N

                                                                      Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 42. Query Page Faults

Notes for FLTS command:

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Leave this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

5 Leave this value to default to *NO.

The following table provides a high level view of the reports available using this command. Section 10.4, “Page Fault Information (FLTS Command)” on page 363 provides examples of all the reports available from this command.

Table 8 (Page 1 of 2). Page Faulting (FLTS Command)

First Level of Detail	Second Level of Detail
OBJNAM - See Section 10.4.1, “Report Title - Page Faults by Object/Segment Name and Description” on page 363.	OBJNAM/JOB - See Section 10.4.2, “Report Title - Page Faults by Object and Job/Task.” on page 364.
JOB - See Section 10.4.3, “Report Title - Page Faults by Job/Task” on page 366.	JOB/OBJNAM - See Section 10.4.4, “Report Title - Page Faults by Job/Task and Object Name/Segment Type” on page 367. JOB/PGM/OBJNAM - See Section 10.4.5, “Report Title - Object Faults within MI Program within Job” on page 369.

Table 8 (Page 2 of 2). Page Faulting (FLTS Command)

First Level of Detail	Second Level of Detail
POOL - See Section 10.4.6, “Report Title - Page Faults by Mainstore Pool” on page 374	POOL/OBJNAM - See Section 10.4.7, “Report Title - % of Faults by Pool and Object” on page 375. POOL/JOB/OBJNAM - BUG - See Section 10.4.8, “Report Title - Faults by POOL/TDE/OBJ That Are >= 1.0% of the System Page Faults” on page 376.
PGM - See Section 10.4.9, “Report Title - Faults by MI Program that are >= %1.0 of Total System Faults” on page 377.	PGM/OBJNAM - See Section 10.4.10, “Report Title - Page Faults by Program and Object” on page 378. PGM/SLIC - See Section 10.4.11, “Report Title - Faults by Program and Low-level SLIC Program” on page 382. PGM/JOB - See Section 10.4.12, “Report Title - Page Fault by Program and Job/Task Within Program” on page 385.
SLIC - See Section 10.4.13, “Report Title - Faults by SLIC Program that are >=1% of Total System Faults” on page 387.	

Note:

```
Acronyms              Description
*************************************************************************
JOB     - Qualified Job name
OBJNAM  - Object Name.  Not necessarily a program object.
OBJTYP  - Two-digit object type followed by two-digit object subtype.
          The two-digit object type codes are documented in Table 17 on page 246.
          For further information, refer to the
          OS/400 Diagnostic Aids Manual, Volume 1, LY44-4907.
          See also index entry MI Object Names in this redbook.
POOL    - Main Storage Pool Number
PGM     - Program name.  This may be a user program, IBM system program
          or System Licensed Internal Code program.
```

6.6.5 NETSIZE Reporting Command

Use this command to see the change in net size of objects, both at the job level and at the individual object level. This command can help to spot ″rogue″ jobs.

The reports produced using this command can be difficult to interpret without reference to the *Diagnostics Aids Reference Manual*.

```
                    Net size change from PEX run (NETSIZE)
Type choices, press Enter.
PF132 and PEX files mbr name . .   *FIRST  1    Name, *FIRST
PF132 and PEX file library . . .   _______  2    Name
Delete query files created?  . .   *YES    3    *YES, *NO
Submit as batch job? . . . . . .   *NO     4    *YES, *NO
FORCE RESCAN OF PF132 MBR? . . .   *NO     5    *YES, *NO
Both TEMPs and PERMs?  . . . . .   Y       6    Y, N
TEMP segment/objects?  . . . . .   N       7    Y, N
PERM segments/objects? . . . . .   N       7    Y, N


                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 43. Object Net Size Change During PEX Run

Notes for NETSIZE command:

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Allow this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

5 Allow this value to default to *NO.

6 Allow this value to default to Y so that temporary and permanent objects are combined.

7 Allow this value to default to N. Only IBM Support representatives need to split out temporary and permanent objects in these reports.

The following table provides a high level view of the reports available using this command. Section 10.5, “Disk Space Consumption - Net Size Change from PEX Run (NETSIZE Command)” on page 388 provides examples of all the reports available from this command.

Table 9. Disk Space Consumption - Net change (NETSIZE Command)

First Level of Detail	Second Level of Detail
ALL/OBJNAM/OBJTYP - See Section 10.5.1, “Report Title - Net Size Change (in Bytes) of Individual Segments” on page 388.	ALL/OBJNAM/OBJTYP/SEGTYP - See Section 10.5.2, “Report Title - Net Size Change, Grouped by (Name, Object Type, Segment Type)” on page 390. ALL/OBJDESC - See Section 10.5.3, “Report Title - Net Size Change, Grouped by Object/Segment Description” on page 391. ALL/JOB OR TASK - See Section 10.5.4, “Report Title - Net Size Change by Job or Task” on page 391.
TEMP/OBJNAM/OBJTYP - See Section 10.5.5, “Report Title - Net Size Change (in Bytes) of Individual Segments” on page 392.	TEMP/OBJNAM/OBJTYP/SEGTYP - See Section 10.5.6, “Report Title - Net Size Change, Grouped by (Name, Object Type, Segment Type)” on page 393. TEMP/OBJDESC - See Section 10.5.7, “Report Title - Net Size Change, Grouped by Object/Segment Description” on page 393. TEMP/JOB OR TASK - See Section 10.5.8, “Report Title - Net Size Change by Job or Task” on page 394.
PERM/OBJNAM/OBJTYP - See Section 10.5.9, “Report Title - Net Size Change (in Bytes) of Individual Segments” on page 395.	PERM/OBJNAM/OBJTYP/SEGTYP - See Section 10.5.10, “Report Title - Net Size Change, Grouped by (Name, Object Type, Segment Type)” on page 396. PERM/OBJDESC - See 10.5.11, “Report Title - Net Size Change, Grouped by Object/Segment Description” on page 397. PERM/JOB OR TASK - See 10.5.12, “Report Title - Net Size Change by Job or Task” on page 398.

Note:

```
Acronyms              Description
**************************************************************************
ALL     - Temporary and Permanent space
JOB     - Qualified Job name
OBJDESC - Object Description or where the Virtual address segment does
          not address an object or part of an object, this field gives
          the description of the segment type.
OBJNAM  - Object Name.  Not necessarily a program object.
OBJTYP  - Two-digit object type followed by two-digit object subtype.
          The two-digit object type codes are documented in Table 17 on page 246.
          For further information, refer to the
          OS/400 Diagnostic Aids Manual, Volume 1, LY44-4907.
PERM    - Permanent space
SEGTYP  - Four-digit code defining a virtual address segment.
          The four-digit segment type codes are documented in Section
          9.6.2, "Object and Segment Types Appearing in TRACE Reports" on page 243.
TEMP    - Temporary space
```

6.6.6 ADDR Reporting Command

Use this command to see which programs and jobs are consuming the most temporary and permanent addresses. This command can help to spot ″rogue″ jobs.

The reports produced using this command can be difficult to interpret without reference to the *Diagnostics Aids Reference Manual*.

```
                      Query TEMP/PERM ADDRESSES (ADDR)
Type choices, press Enter.
PF132 and PEX files mbr name . .   *FIRST  1   Name, *FIRST
PF132 and PEX file library . . .   _______  2   Name
Delete query files created?  . .   *YES    3   *YES, *NO
Submit as batch job? . . . . . .   *NO     4   *YES, *NO
Force rescan of PF132 mbr? . . .   *NO     5   *YES, *NO

                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 44. Query Address Utilization

Notes for ADDR command:

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Leave this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

5 Leave this value to default to *NO.

6 Leave this value to default to Y so that temporary and permanent objects are combined.

7 Leave this value to default to N. Only IBM Support representatives need to split out temporary and permanent objects in these reports.

The following table provides a high level view of the reports available using this command. Section 10.6, “Address Consumption - Query Temporary/Permanent Addresses (ADDR Command)” on page 399 provides examples of all the reports available from this command.

Table 10. Address Consumption (ADDR Command)	
First Level of Detail	**Second Level of Detail**
JOB or TASK - See Section 10.6.1, “Report Title - Big Sid Creates per TDE, in Descending Sequence” on page 399	
PGM - See Section 10.6.3, “Report Title - Big Sid Creates by MI Program Without Offset” on page 401	PGM/OFFSET - See Section 10.6.2, “Report Title - SID Creates by MI Program and Offset” on page 400 PGM/ADRTYP - See Section 10.6.4, “Report Title - Big Sid Creates per MI/SLIC Program and Type” on page 402 and Section 10.6.5, “Report Title - Big Sid Creates per MI/SLIC Program and Type” on page 403

Note:

```
Acronyms               Description
*********************************************************************
ADRTYP  - Division of virtual address ranges into Permanent, Temporary
          or Process Access Group Member
JOB     - Qualified Job name
OFFSET  - Program instruction offset
PGM     - Program name.  This may be a user program, IBM system program
          or System Licensed Internal Code program.
TASK    - Task ID number if not associated with a JOB
```

6.6.7 OBJSIZE Reporting Command

Use this command to see the total object size of objects that are touched during the PEX TRACE run. The maximum and average size of objects is also shown; this can help identify out-of-line situations.

```
                    Obj/Seg sizes from PEX files (OBJSIZE)
Type choices, press Enter.
QAYPESEGI file mbr name  . . . .   *FIRST  1   Name, *FIRST
QAYPESEGI library name . . . . .           2   Name
Delete query files created?  . .   *YES    3   *YES, *NO
Submit as batch job? . . . . . .   *NO     4   *YES, *NO

                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 45. Object Sizes during PEX Collection

Notes for OBJSIZE command:

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Leave this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

The following table provides a high level view of the reports available using this command. Section 10.7, “Size of Objects Used During PEX Trace Collection - Obj/Seg Sizes from PEX Files (OBJSIZE Command)” on page 404 provides examples of all the reports available from this command.

Table 11. Size of Objects Used (OBJSIZE Command)

First Level of Detail	Second Level of Detail
SIZE (OBJNAM, OBJTYP)	See Section 10.7.1, “Report Title-Size of Objects Which Were Touched During the STRPEX Run” on page 404.
OBJNAM/OBJDESC (MIN,MAX,AVG)	See Section 10.7.2, “Report Title - Object/Segment Sizes, Grouped by Name and Description” on page 410.
OBJDESC	See Section 10.7.3, “Report Title-Object/Segment Sizes, Grouped by Object/Segment Type (Description) Only” on page 415.

Note:

```
Acronyms               Description
**********************************************************************
OBJDESC - Object Description or, where the Virtual address segment does
          not address an object or part of an object, this field gives
          the description of the segment type.
OBJNAM  - Object Name.  Not necessarily a program object.
OBJTYP  - Two-digit object type followed by two-digit object subtype.
          The two-digit object type codes are documented in Table 17 on page 246.
          For further information, refer to the
          OS/400 Diagnostic Aids Manual, Volume 1, LY44-4907.
```

6.6.8 CPU Reporting Command

Use this command to graphically represent CPU utilization over time. This can be used to identify times when the CPU was either 100% busy or when the CPU appears not busy for a few intervals during an otherwise heavy usage period. Clearly, what was occurring at these identified times requires further investigation.

Important CPU Information!

This command requires a lot of CPU and can take a long time to run. Do **not** run it interactively.

```
                      Print PEX CPU % Report (PRTPEXCPUB)
Type choices, press Enter.
Member . . . . . .              _______  1   Name
Library  . . . . . .            QPEXDATA 2   Name
Millisecond intervals  . . . . . 1000    3   10-60000
Select Task ID . . . . . .      *ALL     4   Character value, *ALL
Submit as batch job? . . . . . .*YES     5   *YES, *NO



                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 46. Print CPU Utilization Report

Notes for PRTPEXCPUB command:

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Either leave the default at one second or **increase** it. Changing this to a value smaller than one second may cause the PRTPEXCPU command to take a long time to complete.

4 If you know the task dispatcher element (TDE) numbers for specific jobs in which you are interested, enter them against this keyword.

5 Run this command in batch whenever possible, changing this value to *YES.

There is only one report available using this command; please refer to Section 10.8, “CPU Utilization - Print PEX CPU % Report (PRTPEXCPUB Command)” on page 416 for an example.

6.6.9 DEACTS Reporting Command

Use this command to investigate which programs are being activated and deactivated most frequently on your system. This can be used to help save CPU time being wasted doing the following tasks:

- Program full terminations (OPM and ILE compatibility mode programs only)
- Activation group creation and deletion

The value you specify against MIBRACKET is not used by the SMTBCH command when PROBLEM (*DEACTS) is specified. The actual value used is always set to MIBRACKET(*ENTEXTMI) so that both application program names and appropriate MI complex instructions are collected in the TRACE data.)

```
                    Query PROGRAM DEACTIVATIONS (DEACTS)

 Type choices, press Enter.

 PF132 and PEX files mbr name . .   *FIRST  1    Name, *FIRST
 PF132 and PEX file library . . .   _____  2    Name
 Delete query files created?  . .   *YES   3    *YES, *NO
 Submit as batch job? . . . . . .   *NO    4    *YES, *NO
 Force rescan of PF132 mbr? . . .   *NO    5    *YES, *NO


                                                                  Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 47. Query Program Activations and Deactivations

Notes for DEACTS command:

This command should only be used if you ran the collection using the SMTBCH command with one of the following options:

1. PROBLEM(*PERF) MIBRACKET(*ENTEXTMI)
2. PROBLEM(*DEACTS)
3. PROBLEM(*ACTGRP)

1 Specify the member name used for the SMTBCH collection command DFN keyword.

2 Specify the library name used for the SMTBCH collection command DATALIB keyword.

3 Leave this value to default to *YES, meaning that query-related work files are deleted once the reports have been produced.

4 Run this command in batch whenever possible, changing this value to *YES.

The following table provides a high level view of the reports available using this command. Section 10.9, “Program Activations and Deactivations (PRTPEXCPUB Command)” on page 430 provides examples of all the reports available from this command.

Table 12 (Page 1 of 2). Program Activation/Deactivation Details (DEACTS Command)

First Level of Detail	Second Level of Detail
JOB - See Section 10.9.2, “Report Title - Total Program Deactivates by Job” on page 430.	JOB/PGM - See Section 10.9.1, “Report Title - Program Activates and Deactivates in Program within Job Sequence” on page 430.
PGM - See Section 10.9.4, “Report Title - Total Activations and Deactivations by Program” on page 431.	PGM/JOB - See Section 10.9.3, “Report Title - Program Activations and Deactivations in Pgm/Job Descending Activation Sequence” on page 431.

Table 12 (Page 2 of 2). Program Activation/Deactivation Details (DEACTS Command)

First Level of Detail	Second Level of Detail
PGMA - See Section 10.9.5, “Report Title - Total Activations and Deactivations by Non-system Program” on page 431.	

Note:

```
Acronyms               Description
**********************************************************************
JOB      - Qualified Job name
PGM      - Program name.  This may be a user program, IBM system program
           or System Licensed Internal Code program.
PGMA     - User program name
```

Chapter 7. Using PEX TRACE

This chapter provides an overview of the data collection and reporting provided for both the Enhanced PEX TRACE and the standard PEX TRACE functions provided in OS/400.

7.1 Why Use the Enhanced PEX TRACE Function?

This function provides extensive reporting capability over and above that provided with the PRTPEXRPT command in the Performance Tools Licensed Program Product. The reports simplify analysis of the collected PEX TRACE data.

If you have ever asked **business** questions such as:

- Can application performance be improved so that I do not have to upgrade my processor?
- Can performance of a function be improved before I roll it into production?
- If application performance can be improved, exactly what areas should the money be spent on to achieve maximum performance payback?
- Within these identified areas, exactly what should be done first (what priorities should be assigned)?

The Enhanced PEX TRACE tools prove to be invaluable.

If you have ever asked **technical** questions such as:

- What database physical files and indexes are SETOBJACC candidates?
- Can overall CPU utilization be reduced by implementing shared open data paths?
- What files are being repetitively opened within individual jobs?
- What object names are all these IOs occurring against?
- My program is doing a lot of IO; what object names are these IOs on and exactly where are they synchronous/asynchronous and database or non-database?
- What objects/IOs are causing unbalanced disk arm utilization?
- Has my ILE application been designed with a view to performance?
- What is the IO breakdown by object name within pool?
- What object names are (page) faults occurring against?

The Enhanced PEX TRACE tool provides this information.

While the PRTPEXRPT command is an essential part of any PEX TRACE analysis because it provides the first phase formatting of PEX TRACE data, additional reports are usually necessary to facilitate analysis of the collected data rather than manually reviewing pages of low-level detail output.

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7.1.1.1 What Data Must Be Collected for Reports?

The following table describes what types of data must be collected using the SMTBCH command (see Figure 27 on page 134 for details of this command).

Table 13 (Page 1 of 2). Enhanced PEX TRACE Data Collection and Reporting Options

Data to Collect for SMTBCH Command "Problem Type"	**Report Menu Option Available on PEXTRC02 Menu**	**Reporting Command**
Performance[1] *PERF[3]	01. Full File Opens[1] 02. Physical Disk IO[1] 03. Activation Group Creates 04. Faults 05. Disk Space Consumption[2] 06. Address Consumption[2] 07. Size of Objects used During Pextrace Collection 08. CPU Utilization 09. Program Activations and Deactivations	OPENS IOS ACTGRP FLTS NETSIZE ADDR OBJSIZE PRTPEXCPUB DEACTS
Performance *DASDPERF1[5]	02. Physical Disk IO[5] 07. Size of Objects used During Pex Trace Collection 08. CPU Utilization	IOS OBJSIZE PRTPEXCPUB
Performance *DASDPERF2[6]	02. Physical Disk IO[6] 04. Faults 07. Size of Objects used During Pex Trace Collection 08. CPU Utilization	IOS FLTS OBJSIZE PRTPEXCPUB
Virtual Addresses *ADDRESSES[4]	06. Address Consumption 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	ADDR OBJSIZE PRTPEXCPUB
Disk Utilization/IO *BUSYDISK[1]	02. Physical Disk IO[1] 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	IOS OBJSIZE PRTPEXCPUB
Object size/Change in Size *DISKSPACE[4]	05. Disk Space Consumption[4] 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	NETSIZE OBJSIZE PRTPEXCPUB
Full File Opens *OPENS[1]	1. Full File Opens[1] 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	OPENS OBJSIZE PRTPEXCPUB
Activation Groups *ACTGRP	03. Activation Group Creates 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization 09. Program Activations and Deactivations	ACTGRP OBJSIZE PRTPEXCPUB DEACTS
Program Deactivations *DEACTS	03. Activation Group Creates 07. Size of Objects used during PEX Trace Collection 08. CPU Utilization 09. Program Activations and Deactivations	DEACTS ACTGRP OBJSIZE PRTPEXCPUB

Table 13 (Page 2 of 2). Enhanced PEX TRACE Data Collection and Reporting Options

Data to Collect for SMTBCH Command "Problem Type"	Report Menu Option Available on PEXTRC02 Menu	Reporting Command
Job Task switches[7] *JOBSWAIT[7]	None[7]	None[7]

Note:

1. = Must specify MI *ENTEXTMI in order to get application program names.

2. = While these reports run from *PERF data, normally the *PERF data run is too short for these reports to be meaningful.

3. = More data is collected using *PERF than any other choice. Choose a short run time for *PERF collections of 5 to 10 minutes only.

4. = Use a long run time for these options (consider using 10+ hours). Long run times are essential for meaningful reports to be produced from these options. Thus, do not run these reports against *PERF runs (short trace time) as results are misleading.

5. = Application program names are not collected using this option; application program name appears as 'TOPOFSTACK' on reports.

Events collected are:

- DASD events - Read Start, Read Completion, Write Start, Write Completion
- BASE events - PMCO:

 ASM and SAR events are not collected.

6. = Application program names are not collected using this option; application program name appears as 'TOPOFSTACK' on reports.

Events collected are:

- DASD events - Read Start, Read Completion, Write Start, Write Completion
- SAR events
- BASE events - PMCO:

 ASM events are not collected.

7. = This option is provided for IBM Software Support use only. There are no reports available.

7.1.2 Can PEX TRACE Fill Up DASD?

When running standard PEX TRACE or Enhanced PEX trace, there is a concern that recording trace data may possibly fill up all remaining physical disk storage. You need to be aware of the following considerations in this area.

While PEX TRACE does collect a large amount of data, the maximum amount of disk space it is allowed to consume in a single run is limited to one-third of all available disk space. If this threshold is reached, data collection is automatically suspended. PEX collection is implemented in LIC through the Performance Data Collector (PDC) and it is the PDC that has this built-in check to ensure that all disk space is not filled up with PEX data.

However, the Enhanced PEX TRACE support includes options to automatically generate reformatted collection data and produce printed reports from supplied queries. It is this "post-collection" processing that may cause all remaining disk to be consumed.

You should not collect PEX STATS or PEX TRACE data on a system that already indicates auxiliary storage is above 90% occupied.

7.2 What Does the Enhanced PEX TRACE Function Provide?

1. A simple menu interface. Follow the options on this menu in the numeric sequence provided (the menu is PEXTRC01 in library QYPINT). See Section 6.4.1, “PEX Trace Main Menu (PEXTRC01)” on page 132 for a picture of this menu.
2. A single command called SMTBCH to:
 a. Automatically create a PEX TRACE definition tailored to your collection requirements.
 b. Automatically start collecting PEX TRACE data using the newly-created definition.
 c. Automatically end PEX TRACE collection after reaching either a specified elapsed trace time or reaching a specified amount of trace data.
 d. Automatically run the PRTPEXRPT command and process the formatted spooled file data back into database files such that it is ready for the reporting functions.
3. Provides additional reporting capability to that available using the PRTPEXRPT command. Typically, these reports are classified into categories such as IOs, and are available from the PEX Reports Menu PEXTRC02.

 Note that these reports use PEX TRACE data that is a processed version of the PRTPEXRPT (base data) detail output. Thus, these reports are at a much higher level and, consequently, easier to interpret.

Many application performance problems have a high degree of commonality. Some of these common problems are:

1. Application (ILE or OPM) does not use shared open data paths (or has this facility implemented incorrectly). This wastes CPU and disk IOs.
2. ILE application programs are ″abusing″ the ILE architectural environment (creating/deleting activation groups unnecessarily). This wastes CPU.
3. Application function is wasting much CPU or IO resource due to poor design, poor implementation, or both.
4. Certain users are using the application in a ″strange″ way such that they use unreasonable system resources.

The Enhanced PEX TRACE reports provide the following type of information:

1. Detail of which files are SETOBJACC candidates, together with the size of the file (if it was used during the PEX TRACE collection).
2. Detail of which files are being fully opened, such that you can quantify whether the amount occurring is a problem. If there is a problem, names of the files/jobs needing attention are provided.
3. Detail of which ILE programs are causing lots of activation groups to be created/deleted, such that you can quantify whether the rate occurring on your system is a problem. If there is a problem, names of the programs needing attention are provided.
4. Detail of which programs are doing lots of IO, together with the names of the objects that these IOs were occurring against.
5. Detail of which programs incur heavy paging, together with the names of the objects that were being paged.

7.2.1 Getting Started Using the Enhanced PEX TRACE Function

Data collection and reporting are simple; report interpretation is the challenging area.

Assuming you have no idea what sort of performance problem is occurring on the system, follow these steps to collect PEX TRACE data:

1. Ensure that library QYPINT is in your library list:

   ```
   ADDLIBLE QYPINT
   ```

2. Call the PEX TRACE Main Menu, by entering the following command;

   ```
   GO PEXTRC01
   ```

3. Since there can be only one active PEX collection session (of any type, STATS, TRACE, or PROFILE) at one time, use PEXTRC01 Menu option 1 to verify that there are no PEX collections already active. If a session is already active, it must be ended before yours can be started.

4. Use the SMTBCH command shown in Figure 48 to collect performance information for all possible problem types and ensure that application program name information is available in the reports.

 Note that we have suggested values for the SMTBCH command options in order to get you started using Enhanced PEX TRACE. You may change these values once you are familiar with using this command.

```
                        V3R6 VERSION OF SMTBCH (SMTBCH)
Type choices, press Enter.
Definition/MBR name  . . . . . > ITSO01  1     Name
Type of problem  . . . . . . . > *PERF   2     *PERF, *ADDRESSES...
Length of trace in minutes . . > 10      3
Maxdata to collect . . . . . . > 500000  4     1-2000000000
Library for collected data . . > DTALIB  5     Character value
Min CPU sample (milliseconds)  .   200    6     50-2000
Trace MI CALL Events?  . . . . > *ENTEXTMI 7   *ENTRYEXIT, *MICMPLX...
Break MSG when time is up? . . .   N      8     Y, N
Submit job to batch? . . . . . .   Y      9     Y, N
Job queue name . . . . . . . . .   QCTL   10    Name
Job queue library  . . . . . . .   *LIBL  11    Name, *LIBL
Trace specific jobs/tasks? . . .   N      12    Y, N
Convert Pex Trace Data?  . . . .   N      13    Y, N
PRTPEXRPT & CPYSPLF to LIB?  . . > Y      13    Y, N
Job Priority for PRTPEXRPT . . .   51     14    10-90

                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 48. PEX Trace Main Menu

Notes for Fastpath Use of SMTBCH Command:

1 The member name to be used for storing PEX TRACE data.

2. Use *PERF as the type of problem, as this is the catch-all category and encompasses all other problem types.

3 Since you are collecting all possible performance information, do not run this command for more than 10 minutes.

4 The default value of 500 000K should allocate sufficient DASD storage to hold all of the necessary trace data. The parameter can be changed, but this value is an excellent starting value.

5 Place the trace collection in a specially created library so that trace data can easily be saved, copied, and deleted as necessary without worrying about other data in the same library.

6 Leave this at the default of 200 milliseconds (changing it to a smaller value increases the overhead of running PEX TRACE).

7 Use *ENTEXTMI to ensure that application names are available on all Enhanced PEX TRACE reports. If the real program name cannot be determined from the collected data, this is shown on Enhanced PEX TRACE reports as ′TOPOFSTACK′ under the Program Name heading.

8 Leave this to default to N. We do not encourage unnecessary use of break message handling on the system; use WRKSBSJOB SBS(QCTL) to check for the presence of job PEXTRACE in order to see whether SMTBCH batch data collection is still active.

9 Always run the SMTBCH command in batch. Use the default of Y.

10 Always run the SMTBCH command from the job queue in the controlling subsystem (usually this is QCTL). Leave this to default to QCTL unless your system has had another controlling subsystem created, in which case you need to find an appropriate job queue to use (ensuring that the SMTBCH batch collection job runs at priority 10).

11 See point **10**.

12 The default of N ensures that all jobs are traced. If you know that the problem is localized to a few jobs, enter Y in order to collect data for those jobs only. Clearly, the less jobs that are being traced system-wide, the lower the overhead of the trace tool.

13 Ensure that either (or both) ″Convert Pex Trace Data?″ or ″PRTPEXRPT & CPYSPLF to LIB?″ is set to Y so that you can produce the reports once the SMTBCH collection job PEXTRACE has completed.

If you use CVTPEX(Y) PRTPEX(N), you must run the PRTPEXRPT command before you can produce the Enhanced PEX TRACE reports.

If you use CVTPEX(N) PRTPEX(Y) or CVTPEX(Y) PRTPEX(Y), PRTPEXRPT is run automatically, enabling you to produce the appropriate Enhanced PEX TRACE reports.

14 This run priority is only used when PRTPEX(Y) is specified. Since the PRTPEXRPT command can be resource-intensive, we recommend that you do **not** change this value.

5. Check whether the collection is still running or has finished by entering WRKSBSJOB SBS(QCTL) and checking for job name PEXTRACE, which is the Enhanced PEX TRACE collection job.

 Alternatively, use option 1 of the PEXTRC01 menu to see whether a collection is active with the same name as the value specified against Definition/Member name on the SMTBCH command.

7.3 What Does the Standard PEX TRACE Function Provide?

The PEX TRACE function provides the ability to collect PEX TRACE data for some or all jobs on the system and subsequently produce a detail-level only report. High-level reports with summarized information are not provided, only one single low-level detail report.

It is the inability to create additional PEX TRACE definitions for collecting tailored subsets of PEX TRACE data that is the constraining factor.

You can, however, obtain extra PEX TRACE definitions (see Table 2 on page 126 for a list) that allow considerably greater collection flexibility. For example, one of these definitions is a CPU profiler, enabling you to produce a histogram showing CPU utilization by program system wide. Please refer to the PTF cover letter to use this ″extra base″ PEX TRACE support.

To run the **base** PEX TRACE support provided with OS/400, you use the familiar sequence of steps:

1. Use the ADDPEXDFN command enabling you to create a PEX definition to be used for PEX TRACE data collection - ADDPEXDFN TYPE(*TRACE).
2. Issue the STRPEX command to collect data using your definition.
3. Issue the ENDPEX command to stop data collection.
4. Issue the PRTPEXRPT command to provide a detail level PEX TRACE report.

 Remember, PRTPEXRPT must specify *TRACE to get the trace report printed successfully.

If you collected PEX TRACE data for all jobs on the system, an example of the detail portion of the PRTPEXRPT output is shown in Figure 49 on page 174.

If you are able to readily interpret this PEX TRACE report and ascertain what, if any, are the performance bottlenecks, you do not need to obtain/run the Enhanced PEX TRACE function. Note that this report does **not** show any physical disk IO or fault activity. However, if you feel that the ability to collect data that tells you in **detail** what your application is doing, you must know:

1. What file names a program is using and how it is using them.
2. The physical disk IOs being performed by each program and which object names these IOs are occurring against.
3. The page faults being caused by each program and what object names these faults are occurring against.

You should obtain the Enhanced PEX TRACE function PTFs.

The following figure is an example of a PRTPEXRPT of standard PEX TRACE support:

```
Library . . : DHPEX
Member. . . : STDTRC
Description : STD TRC DEFN FOR 1 JOB
Type . . . . . : TRACE
Definition Name. . . . . : STDTRC
Defined By . . . . . : A960123A
Definition Description . . . : STD TRACE DFN FOR 1 JOB
Trace Full Option. . . . . : STOPTRC
Trace Size (KB). . . . . : 10000
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
Selected Events:
    Category  : MIBKT Event         -  Machine Interface Program Bracketing Events
         *MISTART             MISTR  -  Machine Interface Instruction Start
         *MICPL               MICPL  -  Machine Interface Instruction Complete
         *EXIT                EXIT   -  Exit
         *ENT                 ENTRY  -  Entry
         *PRECALL             PRECL  -  Pre Call
         *POSTCALL            PSTCL  -  Post Call
         *MISUBENT            MISEN  -  Machine Interface Subassembly Entry
         *MISUBEX             MISEX  -  Machine Interface Subassembly Exit
```

Figure 49 (Part 1 of 5). Standard PEX TRACE Detail Report - Example

```
Library . . : DHPEX
Member. . . : STDTRC
Description : STD TRC DEFN FOR 1 JOB
Time Stamp. : 09.19.58.5296 Task ID: 000083C2 Name: P23XWY32E  A960123A   053411 Run Time (us):          265896 Percent: 92.79
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-------------------------------------------------------------------------------------------------------------------------------

58.531 0   000083C2                                                     EXIT
                              QCACALL         2516    1232318
58.531 0   000083C2                                                     ENTRY
                              OPENBAD         2443    1234761
58.531 0   000083C2                                                     PRECL
                                 1
                              OPENBAD         1237    1235998
58.531 0   000083C2                                                     ENTRY
                              QCLRSLV         1917    1237915
58.531 0   000083C2                                                     MISTR
                QCLRSLV    000059 *MATINVAT       2788    1240703
58.531 0   000083C2                                                     MICPL
                QCLRSLV    00005A *MATINVAT       5353    1246056
58.532 0   000083C2                                                     MISTR
                QCLRSLV    000069 *MATPTRIF        667    1246723
58.532 0   000083C2                                                     MICPL
                QCLRSLV    00006A *MATPTRIF       2186    1248909
58.532 0   000083C2                                                     ENTRY
                              QLIADOPT        1651    1250560
58.532 0   000083C2                                                     MISTR
                QLIADOPT   000003 *RSLVSP          688    1251248
58.532 0   000083C2                                                     MICPL
                QLIADOPT   000004 *RSLVSP         3252    1254500
58.532 0   000083C2                                                     EXIT
                              QLIADOPT         306    1254806
58.532 0   000083C2                                                     MISTR
                QCLRSLV    000189 *DEQ            5622    1260428
58.532 0   000083C2                                                     MICPL
                QCLRSLV    000189 *DEQ            2133    1262561
58.532 0   000083C2                                                     MISTR
                QCLRSLV    000189 *DEQ             431    1262992
58.532 0   000083C2                                                     MICPL
                QCLRSLV    000189 *DEQ             829    1263821
58.532 0   000083C2                                                     MISTR
                QCLRSLV    000189 *DEQ             745    1264566
58.532 0   000083C2                                                     MICPL
                QCLRSLV    000189 *DEQ             794    1265360
58.532 0   000083C2                                                     MISTR
                QCLRSLV    000189 *DEQ             675    1266035
58.532 0   000083C2                                                     MICPL
                QCLRSLV    000189 *DEQ             739    1266774
58.532 0   000083C2                                                     MISTR
                QCLRSLV    000189 *DEQ             822    1267596
58.532 0   000083C2                                                     MICPL
                QCLRSLV    000189 *DEQ             737    1268333
58.548 0   000083C2                                                     MISTR
                QCLRSLV    00019F *ENQ           37854    1306187
```


Figure 49 (Part 2 of 5). Standard PEX TRACE Detail Report - Example

```
Library . . : DHPEX
Member. . . : STDTRC
Description : STD TRC DEFN FOR 1 JOB
Time Stamp. : 09.19.58.5484 Task ID: 000083C2 Name: P23XWY32E  A960123A   053411 Run Time (us):          265896 Percent: 92.79
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-------------------------------------------------------------------------------------------------------------------------------
58.548 0   000083C2                                                     MICPL
                   QCLRSLV    0001A0 *ENQ            1764    1307951
58.548 0   000083C2                                                     MISTR
                   QCLRSLV    00019F *ENQ             340    1308291
58.548 0   000083C2                                                     MICPL
                   QCLRSLV    0001A0 *ENQ             804    1309095
58.548 0   000083C2                                                     MISTR
                   QCLRSLV    00019F *ENQ             330    1309425
58.548 0   000083C2                                                     MICPL
                   QCLRSLV    0001A0 *ENQ             769    1310194
58.548 0   000083C2                                                     MISTR
                   QCLRSLV    00019F *ENQ             319    1310513
58.548 0   000083C2                                                     MICPL
                   QCLRSLV    0001A0 *ENQ             755    1311268
58.548 0   000083C2                                                     MISTR
                   QCLRSLV    00019F *ENQ             300    1311568
58.548 0   000083C2                                                     MICPL
                   QCLRSLV    0001A0 *ENQ             765    1312333
58.548 0   000083C2                                                     MISTR
                   QCLRSLV    0001A9 *DEQ            3876    1316209
58.548 0   000083C2                                                     MICPL
                   QCLRSLV    0001A9 *DEQ            1561    1317770
58.548 0   000083C2                                                     EXIT
                          QCLRSLV          3621    1321391
58.548 0   000083C2                                                     PSTCL
                          OPENBAD           746    1322137
58.548 0   000083C2                                                     PRECL
                          OPENBAD           619    1322756
58.548 0   000083C2                                                     ENTRY
                          QCLCLCPR         2059    1324815
58.548 0   000083C2                                                     MISTR
                   QCLCLCPR   000051 *MATPTR         3390    1328205
58.548 0   000083C2                                                     MICPL
                   QCLCLCPR   000052 *MATPTR         2083    1330288
58.548 0   000083C2                                                     MISTR
                   QCLCLCPR   000098 *RSLVSP         1517    1331805
58.549 0   000083C2                                                     MICPL
                   QCLCLCPR   000099 *RSLVSP        29679    1361484
58.549 0   000083C2                                                     MISTR
                   QCLCLCPR   00012D *MATSOBJ        1921    1363405
58.549 0   000083C2                                                     MICPL
                   QCLCLCPR   00012E *MATSOBJ        6107    1369512
58.549 0   000083C2                                                     MISTR
                   QCLCLCPR   000133 *LOCKSL          458    1369970
58.549 0   000083C2                                                     MICPL
                   QCLCLCPR   000134 *LOCKSL         3089    1373059
58.549 0   000083C2                                                     MISTR
                   QCLCLCPR   000153 *UNLOCKSL        549    1373608
58.549 0   000083C2                                                     MICPL
                   QCLCLCPR   000154 *UNLOCKSL       2298    1375906
58.549 0   000083C2                                                     EXIT
                          QCLCLCPR         1553    1377459
                             2
58.550 0   000083C2                                                     ENTRY   OPEN5/_QRNP_PEP_OPEN5
58.550 0   000083C2                                                     MISTR
                   QRNXIE     000004 *MATINVIF       8249    1449047
58.550 0   000083C2                                                     MICPL
                   QRNXIE     000005 *MATINVIF       1091    1450138
58.550 0   000083C2                                                     ENTRY
```

Figure 49 (Part 3 of 5). Standard PEX TRACE Detail Report - Example

```
                                    3
                                 QDMCOPEN        3246    1453384
58.550 0   000083C2                                              MISTR
                 QDMCOPEN   000007 *MATINVIF       2543    1455927
58.550 0   000083C2                                              MICPL
                 QDMCOPEN   000008 *MATINVIF       2340    1458267
58.550 0   000083C2                                              MISTR
                 QDMCOPEN   0001DD *RSLVSP         4645    1462912
58.551 0   000083C2                                              MICPL
                 QDMCOPEN   0001DE *RSLVSP        33220    1496132
58.551 0   000083C2                                              MISTR
                 QDMCOPEN   000214 *MATPTR          563    1496695
58.551 0   000083C2                                              MICPL
                 QDMCOPEN   000215 *MATPTR         1751    1498446
58.551 0   000083C2                                              MISTR
                 QDMCOPEN   00033D *CRTDOBJ        2189    1500635
58.552 0   000083C2                                              MICPL
                 QDMCOPEN   00033E *CRTDOBJ       55230    1555865
58.552 0   000083C2                                              MISTR
                 QDMCOPEN   0003D2 *RSLVSP         2272    1558137
58.552 0   000083C2                                              MICPL
                 QDMCOPEN   0003D3 *RSLVSP         5601    1563738
58.552 0   000083C2                                              MISTR
                 QDMCOPEN   0003D8 *SETACST         612    1564350
58.552 0   000083C2                                              MICPL
                 QDMCOPEN   0003D9 *SETACST        4840    1569190
58.552 0   000083C2                                              MISTR
                 QDMCOPEN   0005F6 *LOCK           6289    1575479
58.552 0   000083C2                                              MICPL
                 QDMCOPEN   0005F7 *LOCK           7138    1582617
58.552 0   000083C2                                              ENTRY
                                    3
                                 QDBOPEN         2968    1585585
58.552 0   000083C2                                              MISTR
                 QDBOPEN    00000B *MATPTR         3541    1589126
58.552 0   000083C2                                              MICPL
                 QDBOPEN    00000C *MATPTR         2631    1591757
58.552 0   000083C2                                              MISTR
                 QDBOPEN    0007E9 *CRTS           4566    1596323
58.566 0   000083C2                                              MICPL
                 QDBOPEN    0007EA *CRTS         145310    1741633
58.566 0   000083C2                                              MISTR
                 QDBOPEN    0005A1 *ACTCR          3930    1745563

                                                  MO5
```

Figure 49 (Part 4 of 5). Standard PEX TRACE Detail Report - Example

```
                                                Performance Explorer Report                                  8/01/96  9:20:47
                                                   Trace Information                                               Page
                                                                                                                     11
Library . . : DHPEX
Member. . . : STDTRC
Description : STD TRC DEFN FOR 1 JOB
Time Stamp. : 09.19.58.5672 Task ID: 000083C2 Name: P23XWY32E  A960123A   053411 Run Time (us):          265896 Percent: 92.79
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-------------------------------------------------------------------------------------------------------------------------------
58.567 0   000083C2                                              MICPL
                 QDBOPEN    0005A2 *ACTCR         26747    1772310
58.567 0   000083C2                                              EXIT
                                 QDBOPEN         1875    1774185
58.567 0   000083C2                                              EXIT
                                 QDMCOPEN        1730    1775915
58.567 0   000083C2                                              ENTRY
                                 QDMCOPEN        4443    1780358
58.567 0   000083C2                                              MISTR
                 QDMCOPEN   000007 *MATINVIF       2213    1782571
```

Figure 49 (Part 5 of 5). Standard PEX TRACE Detail Report - Example

Notes for PEX Standard TRACE Report Example:

This example traced calling program OPENBAD PARM(5), where OPENBAD is an OPM CL program that calls an ILE compatibility mode RPG program OPEN5 a total of five times. The RPG program OPEN5 opens five database files (PF01, PF02, PF03, PF04, and PF05). Shared open data paths are not used in the calling CL program, so the PFnn files are fully opened upon each call to program OPEN5.

A ″standard″ PEX TRACE definition (with an invariant set of PEX event types that can be traced) was used to collect the data. This definition was created using the QSYS/ADDPEXDFN command which is part of standard OS/400 PEX TRACE support.

1 This is where OPM CL program OPENBAD was called, indicated by the Event column showing ″ENTRY″ and the CurrentPgm showing ″OPENBAD″.

2 This is where ILE RPG program OPEN5 was called, indicated by the Event column showing ″ENTRY″ and the CurrentPgm showing ″OPEN5″.

3 A database file open always involves a call to QDMCOPEN (data management common open) followed by a call to either QDBOPEN (full database file open) or QDBSOPEN (shared database file open).

While there are a lot of MI complex instructions (that begin with ′*′) in this report, there are no Segment Address Range (SAR) events. This is because a PEX TRACE definition created using the QSYS/ADDPEXDFN command does **not** collect Segment Address Request (SAR) events or physical disk IO events. It is necessary to collect Segment Address Range (SAR) events in order to determine the name of the file being opened.

We can conclude from this example that, without the capability to collect SAR events or physical disk IO events, the standard PEX TRACE definition is of limited use. It does, however, enable us to see the flow of program control in a job; but for a single job, it is easier to see the control flow using PEX STATS hierarchical option, which gives invocation levels against program names.

7.4 How Does the Enhanced PEX TRACE Differ?

Enhanced PEX TRACE allows you to:

- Automatically build a definition that can collect more types of trace events than available with the standard PEX TRACE. For example, you can collect physical disk IO events using Enhanced PEX TRACE.
- Have this definition tailored to the type of analysis you want to perform. In the case of analyzing full file opens, we need to collect:
 1. SAR events of type ″Exchange Read″ to provide us with the file name being opened.
 2. MIBRACKET events of type ″Entry″ and ″Exit″ such that we see application program names as well as the system routines QMCOPEN and QDBOPEN that are involved in a full file open.
 3. Performance Measurement Counter Overflow (PMCO) events, such that we get an incremented CPU used counter on each of the statements.

Since more complex data is collected using Enhanced PEX TRACE, a reporting capability exceeding that provided by the base PRTPEXRPT command is essential in order to be able to extract useful information from all this data. Note that the preceding extract report was produced using the PRTPEXRPT command against data collected using Enhanced PEX TRACE. The additional reports in Enhanced PEX TRACE are implemented using commands tailored to the type of data collected; thus, a command called OPENS is used to analyze a collection of type SMTBCH ...PROBLEM(*OPENS).

7.4.1 Enhanced PEX TRACE - Detail Report on Full Opens Scenario

An example of the base data collected using Enhanced PEX TRACE follows. This report was produced using the standard PRTPEXRPT command available with the Performance Tools LPP. We can, therefore, conclude that the PRTPEXRPT command is capable of formatting a detail report that includes all possible types of PEX TRACE data. Its output is, however, limited by the types of PEX event data that can be collected.

```
                                    Performance Explorer Report                    8/01/96  8:51:46
                                      Definition Information                              Page
                                                                                             1

Library . . : DHPEX
Member. . . : OPENSA
Description : *BLANK
Type . . . . . . . . . . . . : TRACE
Definition Name. . . . . . . : OPENSA
Defined By . . . . . . . . . : A960123A
Definition Description . . . : *BLANK
Trace Full Option. . . . . . : STOPTRC
Trace Size (KB). . . . . . . : 50000
Include Dependent Jobs . . . : YES
Sample Interval (ms) . . . . : 200
Selected Jobs:
    Name       User       Number
    P23XWY32E  A960123A   053411
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *NONE
Selected Events:
    Category  : BASE                -  Base Events
         *PMCO                PMCO   -  Performance Measurement Counter OverFlow
    Category  : SAR                 -  Segment Address Register Events
         *EXCHREAD            RXN S  -  Exchange Read
    Category  : MIBKT Event         -  Machine Interface Program Bracketing Events
         *EXIT                EXIT   -  Exit
         *ENT                 ENTRY  -  Entry


                                    MO5
                                    Performance Explorer Report                    8/01/96  8:51:46
                                          Run Information                               Page
                                                                                             2

Library . . : DHPEX
Member. . . : OPENSA
Description : *BLANK
Sessions since IPL. . . . . . . . . . . . . :                       167
Session name. . . . . . . . . . . . . . . . : OPENSA
Start time. . . . . . . . . . . . . . . . . : 1996-08-01-08.47.23.959864
Stop time . . . . . . . . . . . . . . . . . : 1996-08-01-08.47.48.315824
Total time  DD-HH.MM.ss.uuuuuu. . . . . . . :         00-00.00.24.355960
Suspend time (us) . . . . . . . . . . . . . :                    30,192
Number of events. . . . . . . . . . . . . . :                       715
Trace wrap count. . . . . . . . . . . . . . :                         0
Job creating session. . . . . . . . . . . . : PEXTRACE  A960123A  053415
Started by user . . . . . . . . . . . . . . : A960123A
Target system . . . . . . . . . . . . . . . : ITSOMO5
Serial number . . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . . :                    98,304
OS/400 level. . . . . . . . . . . . . . . . : 50N
Version . . . . . . . . . . . . . . . . . . : V3R6MO
Configured ASPs . . . . . . . . . . . . . . :                         1
Logical DASDs . . . . . . . . . . . . . . . :                         7
Data areas. . . . . . . . . . . . . . . . . :                         1
Jobs/tasks in session . . . . . . . . . . . :                       183
Jobs in session . . . . . . . . . . . . . . :                         1

                                    MO5
```

Figure 50 (Part 1 of 3). Enhanced PEX TRACE Detail Report - from OPENS Command Collection

```
                                        Performance Explorer Report                          8/01/96  8:51:46
                                             Task Information                                       Page
                                                                                                       3
Library . . : DHPEX
Member. . . : OPENSA
Description : *BLANK
Task ID    Job/Task Name                 Pool Priority Existence    Elapsed Time (us)        Run Time (us) Run Time
                                                Start/End                                          Percent
-------------------------------------------------------------------------------------------------------------------
  000083C2 P23XWY32E  A960123A   053411     4      160   Y    Y             24256096               479000     45.54
-------------------------------------------------------------------------------------------------------------------
37.105 0   000083C2                                                  EXIT
                                QCACALL        43309 2134222699
37.105 0   000083C2                                                  ENTRY
                                 1
                                OPENBAD         2432 2134225131
37.105 0   000083C2                                                  ENTRY
                                QCLRSLV         3296 2134228427
37.105 0   000083C2                                                  ENTRY
                                QLIADOPT       12054 2134240481
37.105 0   000083C2                                                  EXIT
                                QLIADOPT        4016 2134244497
37.106 0   000083C2                                                  EXIT
                                QCLRSLV        23024 2134267521
37.106 0   000083C2                                                  ENTRY
                                QCLCLCPR        3104 2134270625
37.106 0   000083C2                                                  EXIT
                                QCLCLCPR       48014 2134318639

                                          M05
```

Figure 50 (Part 2 of 3). Enhanced PEX TRACE Detail Report - from OPENS Command Collection

```
Library . . . : DHPEX
Member. . . . : OPENSA
Description . : *BLANK
Time Stamp. . : 08.47.37.1075 Task ID: 000083C2 Name: P23XWY32E  A960123A   053411 Run Time (us):          479000 Percent: 45.54
                  Address    Offset Object Name          Obj  Seg  PRE       NPgs LIC-Pgm--Offset MI-Pgm-----Offset NAGP PI AI
                                                         T ST T ST FIX            Unit Sector Span SKP XCH          EXID IEID
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-------------------------------------------------------------------------------------------------------------------------------

                                    2
37.107 0   000083C2                 OPEN5          63393 2134382032    ENTRY   OPEN5/_QRNP_PEP_OPEN5
37.107 0   000083C2                                                     ENTRY
                                    3
                                    QDMCOPEN       11789 2134393821
                                  4
37.108 0   000083C2 2403BB1E57 000000 PF05      PF05       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.108 0   000083C2 2403BB1E57 000000 PF05      PF05       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.109 0   000083C2                                                     ENTRY
                                    3
                                    QDBOPEN       124257 2134518078
37.124 0   000083C2                                                     EXIT
                                    QDBOPEN       178108 2134696186
37.124 0   000083C2                                                     EXIT
                                    QDMCOPEN        1596 2134697782
37.124 0   000083C2                                                     ENTRY
                                    QDMCOPEN        3748 2134701530
                                  5
37.135 0   000083C2 0006AFB9B4 000000 PF04      PF04       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.135 0   000083C2 0006AFB9B4 000000 PF04      PF04       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.135 0   000083C2                                                     ENTRY
                                    QDBOPEN       141538 2134843068
37.151 0   000083C2                                                     EXIT
                                    QDBOPEN       171460 2135014528
37.151 0   000083C2                                                     EXIT
                                    QDMCOPEN        1338 2135015866
37.151 0   000083C2                                                     ENTRY
                                    QDMCOPEN        3675 2135019541
                                  6
37.152 0   000083C2 039789275C 000000 PF03      PF03       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.152 0   000083C2 039789275C 000000 PF03      PF03       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.152 0   000083C2                                                     ENTRY
                                    QDBOPEN       112276 2135131817
37.171 0   000083C2                                                     EXIT
                                    QDBOPEN       181116 2135312933
37.171 0   000083C2                                                     EXIT
                                    QDMCOPEN        1384 2135314317
37.171 0   000083C2                                                     ENTRY
                                    QDMCOPEN        3695 2135318012
                                  7
37.172 0   000083C2 1F9A7DC2B9 000000 PF02      PF02       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.173 0   000083C2 1F9A7DC2B9 000000 PF02      PF02       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.173 0   000083C2                                                     ENTRY
                                    QDBOPEN       111601 2135429613
37.188 0   000083C2                                                     EXIT
                                    QDBOPEN       112794 2135542407
37.188 0   000083C2                                                     EXIT
                                    QDMCOPEN        1278 2135543685
37.188 0   000083C2                                                     ENTRY
                                    QDMCOPEN        3619 2135547304
                                  8
37.189 0   000083C2 1A88262EF5 000000 PF01      PF01       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.189 0   000083C2 1A88262EF5 000000 PF01      PF01       0D50 0001  P  RXN S 0001 cfclone  0003F4 QDMCOPEN   006528      00
37.189 0   000083C2                                                     ENTRY
                                                                    10
                                    QDBOPEN       115201 2135662505
37.206 0   000083C2                                                     EXIT
                                    QDBOPEN       180040 2135842545
37.206 0   000083C2                                                     EXIT
                                    QDMCOPEN        1293 2135843838
37.206 0   000083C2                                                     ENTRY
                                    QDBGETM         5437 2135849275
37.207 0   000083C2                                                     EXIT
                                    QDBGETM        67348 2135916623
37.207 0   000083C2                                                     ENTRY
                                    QDBGETM         4342 2135920965
37.208 0   000083C2                                                     EXIT
                                    QDBGETM        62787 2135983752
            (TWO ENTRY EXIT SETS TO QDBGETM REMOVED FOR BREVITY.)
37.209 0   000083C2                                                     ENTRY
                                    QDBGETM         4180 2136116630
37.210 0   000083C2                                                     EXIT
                                    QDBGETM        59878 2136176508
37.210 0   000083C2                                                     ENTRY
                                    9
                                    QDMCLOSE        4357 2136180865
37.210 0   000083C2                                                     ENTRY
                                    9
                                    QDBCLOSE        8524 2136189389
37.210 0   000083C2                                                     EXIT
37.340 0   000083C2                                                     ENTRY
```

Figure 50 (Part 3 of 3). Enhanced PEX TRACE Detail Report - from OPENS Command Collection

Note the following:

This example traced the following program:

```
CALL OPENBAD 5
```

Where OPENBAD is an OPM CL program that calls an ILE compatibility mode RPG program OPEN5 a total of five times. The RPG program OPEN5 opens five database files (PF01, PF02, PF03, PF04 and PF05). Shared open data paths are not used in the calling CL program so the PFnn files are fully opened upon each call to program OPEN5.

The SMTBCH Enhanced PEX TRACE command was used to collect PROBLEM data of type *OPENS. This caused the SMTBCH command to build a new PEX definition using the QYPINT/ADDPEXDFN command; this definition collected event data that is not available using standard PEX TRACE support (it collected SAR events so that we can find the file names being opened).

1 This is where OPM CL program OPENBAD was called, indicated by the Event column showing ″ENTRY″ and the CurrentPgm showing ″OPENBAD″.

2 This is where ILE RPG program OPEN5 was called, indicated by the Event column showing ″ENTRY″ and the CurrentPgm showing ″OPEN5″.

3 A database file open always involves a call to QDMCOPEN (data management common open) followed by a call to either QDBOPEN (full database file open) or QDBSOPEN (shared database file open).

Contrast this report with the Standard PEX TRACE report over exactly the same programs, shown in Figure 49 on page 174. In this report, the lines between QDMCOPEN and QDBOPEN are completely different to those in Standard PEX; we collected SAR events and did not collect MI complex instructions. The standard report in Figure 49 on page 174 shows MI complex instructions (which do not include the file name being opened); however, neither SAR events or physical disk IOs can be collected so we do not see any file names.

It is necessary to collect SAR events in order to determine the name of the file being opened.

4 This is a SAR event record. It shows that file name PF05 member name PF05 is being opened.

It is interesting to note that the original RPG source specified the files to be opened in the order PF01, PF02, PF03, PF04, and PF05. Thus, we can see that files are opened in the reverse order in which they are specified in RPG.

5 This SAR event record shows that file name PF04 member PF04 is being opened.

6 This SAR event record shows that file name PF03 member PF03 is being opened.

7 This SAR event record shows that file name PF02 member PF02 is being opened.

8 This SAR event record shows that file name PF01 member PF01 is being opened.

9 Note that the combination of QDMCLOSE (data management close) followed by QDBCLOSE (database file close) indicates that a full database file close has occurred.

10 The value under ″Run Cycles″ is a representation of the amount of cumulative CPU used at that instruction within the job.

All though the heading is *Run Cycles*, the values shown are CPU milliseconds.

We can conclude from this example that we need the capability to collect SAR events or physical disk IO events in order to see the names of objects (files, in this case) being operated on. This is one of the primary reasons for using Enhanced PEX TRACE. Finally, it is much easier to use the reports produced from the Enhanced PEX TRACE OPENS command than plow through this level of detail. Please refer to Section 10.1, “Full File Opens (OPENS Command)” on page 249 for examples of all Enhanced PEX reports produced using the OPENS command.

7.4.2 Enhanced PEX TRACE - Detail Report on Data Queue Send Scenario

The technique of converting the CPU cycles figure into cumulative CPU milliseconds used at that event within the job can be useful because it enables us to see the CPU time being used between events such as data queue reads.

We have used this technique to investigate data queue server jobs at client sites. The low level trace data has been used to highlight design problems with data queue server jobs, as it clearly illustrates where CPU time is being spent. We have seen data queue server jobs where 60% of the CPU time is being spent processing the CL commands RTVDTAARA and CHGDTAAARA, and the remaining 40% of the CPU time is being spent doing the work of processing the data queue entries. Clearly, such low level analysis of trace data can assist with determining application design changes (in the case of this client, the RTVDTAARA and CHGDTAARA commands were being issued prior to every data queue read and were only being issued in order to determine whether the data queue server job should be ended). Note that the recommendation, in this case, was to change the processing and remove the RTVDTAARA and CHGDTAARA commands completely, and send a special entry to the data queue saying ″ENDME″ when the job should be ended. Thanks to PEX TRACE, we were able to prove exactly where the CPU time was being spent and see where significant savings could be made since the cumulative CPU time within the job is placed in each PEX TRACE event.

In this example, we find out what the CPU service time is for placing an entry on a data queue.

We used SMTBCH to collect the TRACE data for an RPG program called SNDDTAQ, which put four entries on a data queue called DQ01.

We specified:

- Data collection using:

  ```
  SMTBCH DFN(DTAQ) PROBLEM(*PERF) DURATION(5) DATALIB(DHPERF) MIBRACKET(*EN
  TEXTMI) ADDJOBS(Y) PRTPEX(Y)
  ```

 1. Our job as the only job for which to collect data on the ADDJOBS (Additional Jobs) prompt.
 2. Use MIBRACKET(*ENTEXTMI) in order to collect both program names (that show as ENTRY and EXIT in the ″EVENT″ column of the PRTPEXRPT report and program name under the ″CurrentPgm″ column) and MI complex instructions.

We need to see the MI complex instructions *ENQ (enqueue) resulting from writing an entry to our data queue (CurrentPgm = QSNDDTAQ). There are both MISTR (MI start) and MICPL (MI completion) entries for the MI complex instructions; we are only interested in the CPU time in between *ENQ MISTR (enqueue starts) in order to determine the CPU time taken to send an entry to the data queue.

SMTBCH always prints the PEX TRACE detail report using *TASK as the value against the TRACEOPT keyword, as shown in the following example:

```
PRTPEXRPT MBR(DTAQ) LIB(DHPERF) TYPE(*TRACE) TRACEOPT(*TASK)
```

This produces the following report, of which only part of the Trace Information section is shown.

```
                12
Time Stamp. : 15.38.41.4027 Task ID: 000083C2 Name: P23XWY32E  A960123A   053411 Run Time (us):          557256 Percent: 53.79
                  Address    Offset Object Name          Obj  Seg  PRE       NPgs LIC-Pgm--Offset MI-Pgm-----Offset NAGP PI AI
                                                         T ST T ST FIX           Unit Sector Span SKP XCH          EXID IEID
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-------------------------------------------------------------------------------------------------------------------------------
  (some entries removed here)
41.469 0   000083C2                                                    EXIT
                                  QCACALL         2565 2146011346
                                                                        1                     1
41.469 0   000083C2                                                    AGAPR                 SNDDTAQ
                                                  2170 2146013516
41.469 0   000083C2 24C8126D33 000000 SNDDTAQ              0201 0001  P WRT A 0001 #domodso 0007FC QCACALL    003AE0      00
41.469 0   000083C2 24C8126D33 000000 SNDDTAQ              0201 0001  P *WS A 0001 0030 022746       N   N               04 01
41.470 0   000083C2 24C8126D33 0001B4 SNDDTAQ              0201 0001  P PFS        #aiaa    0005EC QCACALL    003AE0
                                         2                              2
41.470 0   000083C2                    SNDDTAQ        72093 2146085609    ENTRY  2SNDDTAQ/_QRNP_PEP_SNDDTAQ
41.471 0   000083C2 0C55F73F7E 000504 SNDDTAQ              0201 0022  P PFS                     SNDDTAQ    0013A4
41.471 0   000083C2 0000000003 A1B003 SM PERM DIR SEGMENT  0000 0000  P PFS        IxRadix3 000238
41.471 0   000083C2 0000000003 A1B000 SM PERM DIR SEGMENT  0000 0000  P *RSF  0001 0080 02A61B       N   N               01 01
41.485 0   000083C2 0C55F73F7E 000000 SNDDTAQ              0201 0022  P *RSF  0001 0080 02340D       N   N               04 01
41.494 0   000083C2                                                    AGAPR                 QSNDDTAQ
                                                 77315 2146162924
41.494 0   000083C2                                                    ENTRY  3
                                         3
                                  QSNDDTAQ        6302 2146169226
41.495 0   000083C2 0761B29A61 000020 DQ01               0A01 0002  P PFS                     QSNDDTAQ   0037FC
41.495 0   000083C2 0761B29A61 000000 DQ01               0A01 0002  P *RSF  0001 0080 018658       N   N               04 01
41.501 0   000083C2 1FD3CDC816 000000 DQ01               0A01 0001  P WRT A 0001 #domodso 000300 QSNDDTAQ   00392C      00
41.502 0   000083C2 1FD3CDC816 000022 DQ01               0A01 0001  P PFS        #sv14ckp 00007C QSNDDTAQ   003B20
41.502 0   000083C2                                                    MISTR
                  QSNDDTAQ   000194 *LOCKSL        86317 2146255543
41.502 0   000083C2                                                    MICPL
  13
                       QSNDDTAQ   000195 *LOCKSL         3419 2146258962
41.502 0   000083C2                                                    MISTR  4
                  4                4
                  QSNDDTAQ   00007E *ENQ            1593 2146260555
41.502 0   000083C2 1FD3CDC816 001418 DQ01               0A01 0001  P PFS        QuQueueC 000004 QSNDDTAQ   0021BC
41.502 0   000083C2 1FD3CDC816 001000 DQ01               0A01 0001 PM *RSF  0001 0011 03739B       N   N               04 01
41.521 0   000083C2 1FD3CDC816 000000 DQ01               0A01 0001 PM *WS A 0001 0011 03739A       N   N               04 01
41.522 0   000083C2 1FD3CDC816 000000 DQ01               0A01 0001 PM *WS A 0001 0012 03739A       N   N               04 01
41.538 0   000083C2                                                    MICPL
                  QSNDDTAQ   00007F *ENQ           31797 2146292352
41.538 0   000083C2                                                    MISTR
                  QSNDDTAQ   0000CF *UNLOCKSL        956 2146293308
41.539 0   000083C2                                                    MICPL
                  QSNDDTAQ   0000D0 *UNLOCKSL       2535 2146295843
41.539 0   000083C2                                                    EXIT
                                  QSNDDTAQ         512 2146296355
41.539 0   000083C2                                                    ENTRY
                                  QSNDDTAQ        3793 2146300148
41.539 0   000083C2                                                    MISTR
                  QSNDDTAQ   00019C *LOCKSL         4165 2146304313
41.539 0   000083C2                                                    MICPL
                  QSNDDTAQ   00019D *LOCKSL         2569 2146306882
41.539 0   000083C2                                                    MISTR  5
                  5                5
                  QSNDDTAQ   00007E *ENQ            1052 2146307934
41.539 0   000083C2                                                    MICPL
                  QSNDDTAQ   00007F *ENQ            2525 2146310459
41.539 0   000083C2                                                    MISTR
                  QSNDDTAQ   0000CF *UNLOCKSL        512 2146310971
41.539 0   000083C2                                                    MICPL
41.539 0   000083C2                                                    EXIT
                                  QSNDDTAQ         379 2146313084
41.539 0   000083C2                                                    ENTRY
                                  QSNDDTAQ        2914 2146315998
41.539 0   000083C2                                                    MISTR
                  QSNDDTAQ   00019C *LOCKSL         3652 2146319650
41.539 0   000083C2                                                    MICPL
                  QSNDDTAQ   00019D *LOCKSL         2348 2146321998
                  QSNDDTAQ   0000D0 *UNLOCKSL       1734 2146312705

                                                    M05
```

Figure 51 (Part 1 of 3). Detail DTAQ Enhanced PEX TRACE Example

```
Library . . : DHPERF
Member. . . : DTAQ
Description : *BLANK
Time Stamp. : 15.38.41.5390 Task ID: 000083C2 Name: P23XWY32E  A960123A   053411 Run Time (us):          557256 Percent: 53.79
                  Address    Offset Object Name          Obj  Seg  PRE       NPgs LIC-Pgm--Offset MI-Pgm-----Offset NAGP PI AI
                                                         T ST T ST FIX           Unit Sector Span SKP XCH          EXID IEID
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-------------------------------------------------------------------------------------------------------------------------------
41.539 0   000083C2                                                      MISTR  6
                       6              6
                  QSNDDTAQ   00007E *ENQ             860 2146322858
41.539 0   000083C2                                                      MICPL
                  QSNDDTAQ   00007F *ENQ            2476 2146325334
41.539 0   000083C2                                                      MISTR
                  QSNDDTAQ   0000CF *UNLOCKSL        505 2146325839
41.539 0   000083C2                                                      MICPL
                  QSNDDTAQ   0000D0 *UNLOCKSL       1795 2146327634
41.539 0   000083C2                                                      EXIT
                             QSNDDTAQ          393 2146328027
41.539 0   000083C2                                                      ENTRY
                             QSNDDTAQ         2761 2146330788
41.539 0   000083C2                                                      MISTR
                  QSNDDTAQ   00019C *LOCKSL         3614 2146334402
41.539 0   000083C2                                                      MICPL
                  QSNDDTAQ   00019D *LOCKSL         2384 2146336786
41.539 0   000083C2                                                      MISTR  7
                       7              7
                  QSNDDTAQ   00007E *ENQ             849 2146337635
41.539 0   000083C2                                                      MICPL
                  QSNDDTAQ   00007F *ENQ            2414 2146340049
41.539 0   000083C2                                                      MISTR
                  QSNDDTAQ   0000CF *UNLOCKSL        500 2146340549
41.539 0   000083C2                                                      MICPL
                  QSNDDTAQ   0000D0 *UNLOCKSL       1721 2146342270
41.539 0   000083C2                                                      EXIT
                             QSNDDTAQ          379 2146342649
                                8                                      8
41.540 0   000083C2          SNDDTAQ          5344 2146347993    EXIT    SNDDTAQ/_QRNP_PEP_SNDDTAQ
41.540 0   000083C2                                                      ENTRY
  .
 (intermediate non QSNDDTAQ *ENQ MISTR related entries removed)
  .
                             QMHRCVPM         6842 2146354835
55.667 0   000083C2                                                      ENTRY
55.667 0   000083C2                                              14     EXIT
                             QCATRS          28147 2136424795
55.667 0   000083C2                                                      ENTRY  9
                                9
                             ENDSTATS         2292 2136427087
55.667 0   000083C2                                                      ENTRY
                             QCLRSLV          3023 2136430110
  .
 (intermediate non QSNDDTAQ *ENQ MISTR related entries removed)
  .
                             QCLCLCPR        71754 2136546767
55.669 0   000083C2                                                      ENTRY
                             QSNDDTAQ         4599 2136551366
55.669 0   000083C2                                                      MISTR
                  QSNDDTAQ   00019C *LOCKSL         5893 2136557259
55.669 0   000083C2                                                      MICPL
                  QSNDDTAQ   00019D *LOCKSL         3910 2136561169
55.669 0   000083C2                                                      MISTR  10
                      10             10
                  QSNDDTAQ   00007E *ENQ            1243 2136562412
55.687 0   000083C2                                                      MICPL
                  QSNDDTAQ   00007F *ENQ            7440 2136569852
55.688 0   000083C2                                                      MISTR
                  QSNDDTAQ   0000CF *UNLOCKSL       1264 2136571116
55.688 0   000083C2                                                      MICPL
                  QSNDDTAQ   0000D0 *UNLOCKSL       2595 2136573711
55.688 0   000083C2                                                      EXIT
                             QSNDDTAQ          795 2136574506
  .
 (intermediate non QSNDDTAQ *ENQ MISTR related entries removed)
  .
```

Figure 51 (Part 2 of 3). Detail DTAQ Enhanced PEX TRACE Example

```
                                QCLCLNUP        632 2136605105
55.688 0   000083C2                                          EXIT  11
                                11
                                ENDSTATS        889 2136605994
55.688 0   000083C2                                          ENTRY
```

Figure 51 (Part 3 of 3). Detail DTAQ Enhanced PEX TRACE Example

Note the following:

ILE RPG program SNDDTAQ was run. It placed four records on a data queue DQ01 and then ended.

1 Event type AGAPR denotes the activation of a program. In this case, it is the activation of application program SNDDTAQ.

2 This ENTRY event denotes control being passed to program SNDDTAQ. We can see that this is an ILE RPG program because on the right hand side, we see _QRNP_PEP_SNDDTAQ indicating that this is where the program entry procedure (PEP) of ILE RPG program SNDDTAQ received control.

3 This ENTRY event indicates where MI program QSNDDTAQ received control. Program QSNDDTAQ is the system program used to write entries to a data queue.

″Run Cycles″ Heading

Although the heading is ″run cycles,″ the values shown under this column are CPU milliseconds used.

4 This is the first of the data queue write entries occurring from our program SNDDTAQ. The Parent-Pgm is QSNDDTAQ, the CurrentPgm column shows *ENQ MI complex instruction, and the event type is MISTR (start). This is our reference point for the subsequent data queue writes (enqueue) CPU performance.

This event occurred at 15.38.41.502. Where we get the hours and minutes from the timestamp **12** at the top of the page and the seconds and milliseconds from the ss.mmm column **13**.

5 This is the second of the data queue write entries occurring from our program SNDDTAQ.

6 This is the third of the data queue write entries occurring from our program SNDDTAQ.

7 This is the fourth of the data queue write entries occurring from our program SNDDTAQ.

8 This EXIT event against program SNDDTAQ indicates that our program SNDDTAQ is no longer in control.

9 This ENTRY event is against program ENDSTATS, the program run by the ENDSMTBCH option on the PEX TRACE Main Menu PEXTRC01. All events that follow are occurring as a result of Enhanced PEX Trace ENDSMTBCH command and **not** as a result of running program SNDDTAQ.

When looking at detail PEX TRACE data, ensure that you only review events occurring within your program.

10 Here is another event showing a write to a data queue. This one is nothing to do with our program SNDDTAQ. It is running under program ENDSMTBCH; therefore, we are not interested in this event.

Important!

This is why we cannot just select ″all events″ of a certain kind from the base data, as we do not want to capture events that are part of Enhanced PEX TRACE support and **not** part of the application we are investigating.

11 This EXIT event shows control being passed back from program ENDSTATS. Thus, events following would **not** be occurring under program ENDSTATS.

12 The starting timestamp for entries on this page.

13 The seconds and milliseconds timestamp for individual entries.

14 Note that here the cumulative CPU milliseconds value has gone **negative**. This is because a Performance Measurement Counter Overflow (PMCO) condition has occurred and it is not reflected on this report.

Refer to Appendix D, “Performance Explorer PTF Summary” on page 489 for a list of the PEX-related PTFs that were used to generate the examples in this redbook. After you have applied the recommended PEX PTFs, you must consider the following:

- PRTPEXRPT..TRACEOPT(*TASK) causes accurate cumulative CPU seconds (including the adjustments for PMCO conditions) to appear under the CPU cycles column.
- PRTPEXRPT..TRACEOPT(*TIMESTAMP) produces a report similar to this example, but with all jobs and tasks sorted in timestamp sequence. This report shows cumulative CPU cycles (**without** adjustment for PMCO conditions) under the CPU cycles column.

Chapter 8. Interpreting Standard PEX TRACE Reports

This chapter provides one example of using the PRTPEXRPT on trace data collected under the standard (not Enhanced) PEX TRACE support.

8.1 What Programs are Using Most CPU on the System?

We use an example that ″profiles″ CPU utilization of programs and modules active during the PEX TRACE collection. Use this technique to get a system wide view of which application and system programs (both MI and SLIC) are using most CPU on the system. A simple histogram of which programs are using most CPU can be produced enabling you to see which programs require attention.

8.1.1 Collecting the Data and Produce the Report

You are using one of the predefined PEX TRACE definitions shipped in the PTF described in Section 6.1, “Getting PEX TRACE for IBM Support Analysis of Data” on page 125. Once you have obtained this PTF, you have a set of PEX TRACE definitions called QTRCPROFnn, where nn is a CPU profiling number of 01, 05, 10, or 20 milliseconds. The QTRCPROFnn PEX TRACE definition collects trace data for:

- Performance Measurement Counter Overflow events (*PMCO base events)
- All MI Complex Instructions

Note for Enhanced PEX Trace

Since all of the problem types used by the Enhanced PEX Trace SMTBCH command use definitions that include *PMCO events, you can always produce a CPU profile histogram from data collected using the SMTBCH command. In other words, Enhanced PEX TRACE support includes the CPU profile capabilities described in this chapter.

We recommend that you use definition QTRCPROF05 in order to profile what programs are using CPU at five millisecond intervals. This collects program or module information system wide.

Ensure that you collect the data when the system is in a steady state (not during shift change, mass user sign on or mass user sign off times).

Enter the following commands in the sequence shown:

1. Start PEX TRACE using the command:

   ```
   STRPEX SSNID(ITSOTST) DFN(QTRCPROF05)
   ```

2. Run the trace for the desired time. We suggest 30 minutes during the peak time for your first run.

3. End PEX TRACE using the command:

   ```
   ENDPEX SSNID(ITSOTST) OPTION(*END) DTAOPT(*LIB) TEXT('CPU PROFILING EXAMP
   LE USING PEX TRACE DATA')
   ```

4. Print the CPU Profiling Report using the command:

   ```
   PRTPEXRPT MBR(ITSOTST) TYPE(*PROFILE)
   ```

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Note: Although we collect PEX TRACE data, we must fool the PRTPEXRPT command into believing that it is PEX TRACE data so that we get a histogram of CPU usage printed rather than the standard PEX TRACE detail report.

The following figure is an example of the ″trace profile″ report. Notice that the definition type is TRACE even though the printed report is formatted as if PEX PROFILE was collected and reported.

```
                                        Performance Explorer Report                    8/14/96 15:24:58
                                          Definition Information                              Page
                                                                                                 1

Library . . : QPEXDATA
Member. . . : CPUPROFEX1
Description : PEX TRACE CPU PROFILE example
Type . . . . . . . . . . . . : TRACE
Definition Name. . . . . . . : QTRCPROF05
Defined By . . . . . . . . . : QPEX
Definition Description . . . : System wide CPU profiler, 5 millisecond intervals
Trace Full Option. . . . . . : STOPTRC
Trace Size (KB). . . . . . . : 102400
Include Dependent Jobs . . . : YES
Sample Interval (ms) . . . . : 5
Selected Jobs:
    Name       User       Number
    *ALL       *ALL       *ALL
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *ALL
Selected Events:
    Category  : BASE               -  Base Events
        *PMC0              PMC0    -  Performance Measurement Counter OverFlow
                                        Performance Explorer Report                    8/14/96 15:24:58
                                             Run Information                                Page
                                                                                                 2

Library . . : QPEXDATA
Member. . . : CPUPROFEX1
Description : PEX TRACE CPU PROFILE example
Sessions since IPL. . . . . . . . . . . . :                        241
Session name. . . . . . . . . . . . . . . : CPUPROFEX1
Start time. . . . . . . . . . . . . . . . : 1996-08-14-15.21.37.333952
Stop time . . . . . . . . . . . . . . . . : 1996-08-14-15.23.09.628032
Total time  DD-HH.MM.ss.uuuuuu. . . . . . :         00-00.01.32.294080
Suspend time (us) . . . . . . . . . . . . :                    144,352
Number of events. . . . . . . . . . . . . :                     10,176
Trace wrap count. . . . . . . . . . . . . :                          0
Job creating session. . . . . . . . . . . : P23XWY32E A960123A  054178
Started by user . . . . . . . . . . . . . : A960123A
Target system . . . . . . . . . . . . . . : SYSTEM05
Serial number . . . . . . . . . . . . . . : 10-16CAD
System type . . . . . . . . . . . . . . . : 9406
System model. . . . . . . . . . . . . . . : 510
Total pages memory. . . . . . . . . . . . :                     98,304
OS/400 level. . . . . . . . . . . . . . . : 5ON
Version . . . . . . . . . . . . . . . . . : V3R6M0
Configured ASPs . . . . . . . . . . . . . :                          1
Logical DASDs . . . . . . . . . . . . . . :                          7
Data areas. . . . . . . . . . . . . . . . :                          1
Jobs/tasks in session . . . . . . . . . . :                        304
Jobs in session . . . . . . . . . . . . . :                        124
```

Figure 52 (Part 1 of 4). CPU Profiling Example

```
                                        Performance Explorer Report                    8/14/96 15:24:58
                                      Profile CPU Summary Information                       Page
                                                                                                 3

Library . . . . :  QPEXDATA
Member. . . . . :  CPUPROFEX1
Description . . :  PEX TRACE CPU PROFILE example
Total CPU . . . :      55960720
Job CPU . . . . :      54984088    98.3 %
Task CPU. . . . :        976632     1.7 %
                 ----------------------
Total Samples . :         10176
Total Hits. . . :         10176   100.0 %
```

Figure 52 (Part 2 of 4). CPU Profiling Example

```
                                        Performance Explorer Report                          8/14/96 15:24:58
                                            Profile Information                                     Page    3
Library . . : QPEXDATA
Member. . . : CPUPROFEX1
Description : PEX TRACE CPU PROFILE example
                          Histogram     Hit   Hit   Cum   Start             Map    Stmt   Name
                                        Cnt    %     %    Addr              Flag   Numb
-------------------------------------------------------------------------------------------------------------------
       ****************************** 1  8395  82.5  82.5 8000000000003068   MP        0  LIC
                                *****  2  1562  15.3  97.8 008206D28B001388   MP        0  QSYS
                                       3   216   2.1 100.0 0006AFB9B4000710   MP        0  ITSO
                                           3   0.0 100.0 283A937B6F00A900   MP        0  QTCP
```

Figure 52 (Part 3 of 4). CPU Profiling Example

```
                                        Performance Explorer Report                          8/14/96 15:24:58
                                            Profile Information                                     Page   12
Library . . : QPEXDATA
Member. . . : CPUPROFEX1
Description : PEX TRACE CPU PROFILE example
                          Histogram     Hit   Hit   Cum   Start             Map    Stmt   Name
                                        Cnt    %     %    Addr              Flag   Numb
-------------------------------------------------------------------------------------------------------------------
                               **       600   5.9   5.9 FFFFFFFFC1EDB810   MP        0  IxRadix3  4
                                *       520   5.1  11.0 FFFFFFFFFE044904   MP        0  #aicapgm  5
                                *       481   4.7  15.7 0462CF1A9D001388   MP        0  QDMCOPEN  6
                                *       442   4.3  20.1 FFFFFFFFF42A3C70   MP        0  RmslInterf
                                *       432   4.2  24.3 FFFFFFFFFF006000   MP        0  string
                                *       317   3.1  27.4 800000000017CE9C   MP        0  SmPageDesc
                                        257   2.5  30.0 FFFFFFFFF416B744   MP        0  RmslHoldRe
                                        232   2.3  32.2 80000000000106A8   MP        0  bzero4kp_C
                                        228   2.2  34.5 FFFFFFFFC1F336F8   MP        0  #dbrsqmn
                                        218   2.1  36.6 3339F4CA5E001384   MP        0  QDBGETSQ
                                        212   2.1  38.7 FFFFFFFFF4168AE4   MP        0  RmslHoldHa
                                        198   1.9  40.7 FFFFFFFFC1CC56AC   MP        0  #cfochkr
                                        181   1.8  42.4 FFFFFFFFC1E04530   MP        0  #dbsetcr
                                        173   1.7  44.1 023BFD7099001380   MP        0  QDMCLOSE
                                        157   1.5  45.7 032EEF6C2F0019C8   MP        0  OPEN5  7
                                        156   1.5  47.2 02412F9DAF004E80   MP        0  QRNXIO
                                        143   1.4  48.6 FFFFFFFFC1A3F480   MP        0  IxRadix3Fi
                                        141   1.4  50.0 FFFFFFFFF46EFAE0   MP        0  StackFrame
                                        139   1.4  51.4 0377FE186C001380   MP        0  QDMGETOV
                                        131   1.3  52.7 1048E8F9CD00138C   MP        0  QDBSOPEN
                                        127   1.2  53.9 FFFFFFFFC3183880   MP        0  #domtptr
```

Figure 52 (Part 4 of 4). CPU Profiling Example

Note the following:

1 Percent of samples where CPU was running LIC routines.

2 Percent of samples where CPU was running OS/400 routines.

3 Percent of samples where CPU was running programs in library ITSO.

4 The index module used by system programs (including database) for processing a binary radix tree (index structure).

5 The program to support inter-MI program calls.

6 If the start address does not begin with 'FFFF' or '8000', it does not represent a LIC program. If the start address begins with 'FFFF', the program is a pageable LIC program. If the start address begins with '8000', the program is a LIC program resident in main storage.

The Rochester development lab has chosen not to externally document the functions provided by the LIC programs or LIC program procedure names that appear on this report.

7 This is an application program.

8.1.2 Conclusions

The PEX PROFILE CPU profile report can show work attributed **differently** than how it appears in a PEX STATS or PEX TRACE report. Some of the reasons for this are:

- MI complex instructions are not visible to PEX PROFILE. It is the LIC procedure performing the MI complex instruction that is ″seen″ by PEX PROFILE and, therefore, appears on the CPU profile report.
- Certain MI instructions get into LIC by methods that PEX cannot capture through STATS or TRACE collections. This means that STATS or TRACE attributes work to a MI module/procedure where PEX PROFILE attributes that same work to a LIC procedure.

 Finding LIC tasks and MI Complex Instructions

 For LIC task names, you must refer to *Licensed Internal Code Diagnostic Aids* LY44-4900. For a list of MI complex instructions, refer to Appendix A, “AS/400 MI Complex Instructions (Partial List)” on page 433.

- Other LIC programs or procedures:

 Some of the LIC program names or procedure names, such as IxRadix3, #aicapgm, string, #dbrsqmn, and so on, appear in trace output as shown in our example in Figure 52 on page 190 The development lab has determined not to externally document the functions of these programs/procedures.

 The ″Hit Cnt″ and ″Hit %″ for these programs or procedure names are useful only to IBM software service personnel.

Chapter 9. Interpreting Enhanced PEX TRACE Reports

The purpose of this chapter is to enable the reader to better interpret the information provided in the Enhanced PEX TRACE reports that can be produced from the PEX Reports Menu PEXTRC02. It is **not** to provide the reader with either application performance tuning skills or system performance tuning skills, as those are considered a prerequisite for analysis of performance using PEX TRACE.

Enhanced PEX TRACE Example Disclaimer

In this chapter, we present several examples of the report capabilities of Enhanced PEX TRACE support. As you and IBM become more familiar with the ″Enhanced PEX″ capabilities, we may find additional uses and examples that we were not able to include in this redbook.

Each section is introduced with a heading identifying a particular ″problem type″ or ″set of information to be gathered″ (no actual problem).

9.1 Finding Set Object Access Candidates

Set Object Access support (SETOBJACC command) can be used to specifically tell OS/400 to place an object into main storage and keep it there. For example, do not give some of the main storage pages containing this object up for use by another object or another job.

You want to place an object into storage only if you know (or strongly suspect) there are a significant number of physical disk I/Os being issued to the object in a ″performance critical″ application.

9.1.1 Purpose

Given sufficient memory, performance can be improved **without** application change by explicit placement of physical files and indexes into a ″cache pool.″ This means that the part of response time spent performing physical disk I/O reads to these objects is reduced to zero when they are placed into memory using the SETOBJACC command.

Enhanced PEX TRACE is the **only tool** that provides a report showing which physical files and indexes are good candidates for being placed entirely into main storage and kept there while an application processes this ″cached data.″

When you specifically place an object into a main storage pool, you become responsible for that object and storage pool. So it is strongly recommended you do analysis to ensure you are placing an object into the storage pool that has a large number of I/Os issued against it and that the complete object fits into the allocated storage for that pool.

Please recall that for SETOBJACC to be effective once you have identified the most likely object, you must use the Display Object Description (DSPOBJD) command for the object to determine its size. To be safe, ensure the storage pool is at least 20% larger than the object size listed.

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Note: To be effective, you must use the Clear Pool (CLRPOOL) command before issuing SETOBACC for the object to that storage pool. SETOBJACC issues a completion message after the object has been loaded. This message identifies the number of bytes **remaining in the pool** in case you want to load additional objects into the pool. If the storage pool is too small to contain the complete object, performance may actually degrade compared to normal ″demand paging of objects in and out of main storage.″

9.1.2 What Data to Collect

Use the Enhanced PEX TRACE main menu PEXTRC01 shown in Figure 25 on page 132. Select Option 2 of PEXTRC01 to start a PEX TRACE session. This leads to the SMTBCH data collection command. Specify *PERF or *BUSYDISK or *DASDPERF1 or *DASDPERF2 for the ″Type of Problem″ parameter on the SMTBCH command. See Section 6.4.3, “Collecting Enhanced PEX TRACE Data” on page 133 for a description of the SMTBCH command and the ″Type of Problem″ parameter. This report does not require that MI *ENTRYEXIT events be collected, so ″Trace MI Call Events″ can be left at the default of *NONE.

Specify as short a time as possible for the trace run time and press Enter. After the TRACE has completed, you are ready to print a report of the collected TRACE data.

9.1.3 How to Produce this Report

Use Option 2 on the PEX TRACE Reports Menu (PEXTRC02) to prompt the **IOS** disk I/O reporting command. The PEXTRC02 menu is shown in Figure 29 on page 142. The IOS command is shown in Section 6.6.2, “IOS Reporting Command” on page 149. Use the option ″Objects with 100+ IOs″ on the IOS command to produce the example report shown in Figure 53 on page 195.

Please refer to Section 10.2.6, “Report Title - Objects with 100 or More DASD I/Os” on page 273 for a complete example of IOS report.

9.1.4 Example Report

```
                                                  Objects with 100 or more DASD I/Os

Object name                          I/O    I/O     Average            Percent of
and type                             count  type    pages transferred  all system
                                                    per I/O            I/Os
     3                    1          2
CSTFIL    CSTFIL     0B90          5,361  *RS  A          1.00           65.96
                                       1  *RS  S          1.00             .01
                                       1  *RSF S          1.00             .01
                                       1  *WS  A          1.00             .01
                     TOTAL         5,364                                 65.99
QWCBTO1              19D0              1  *RS  A          1.00             .01
                                       1  *RS  S          3.00             .01
                                       9  *RSF S          1.00             .11
                                     358  *RX  A          7.15            4.40
                                       4  *WS  A          1.25             .05
                                       1  *WS  S          1.00             .01
                     TOTAL           374                                  4.59
                     1
CSTFIL    CSTFIL     0C90            159  *RSF S          1.00            1.96
                                      54  *WS  A          4.63             .66
                     TOTAL           213                                  2.62
                                                                            26
```

Partial report, used for report heading explanations.

Figure 53. Finding SETOBJACC Candidates - Physical Disk IO Example

What to look for:

This report is in descending sequence of total disk I/Os by object. We are only interested in the **read** type of physical disk I/Os for physical files and indexes over physical or logical files.

1 Object type = 0B90 for a physical file Object type = 0C90 for an index (over a physical or a logical file)

For a list of object types, refer to Section 9.6.2, “Object and Segment Types Appearing in TRACE Reports” on page 243 and Section 9.7, “MI Object Types” on page 246.

2 I/O Types starting with ′*R′, denoting physical READ I/Os

For a list of I/O types, refer to Table 16 on page 233.

3 Filename and member name

9.1.5 Report Analysis

Identify the read IOs for physical files and logical files. In the example shown in Figure 53 on page 195, the physical file CSTFIL member CSTFIL and the index over this file are both SETOBJACC candidates as most of the READ disk I/Os happened against these objects. Thus, response time for all jobs doing READ I/Os to these objects is reduced if the objects were resident in memory.

The next step is to determine whether these objects fit into the memory we have available for dedication as SETOBJACC pool (or pools).

Please refer to Section 10.7.1, “Report Title-Size of Objects Which Were Touched During the STRPEX Run” on page 404 for a complete example of the following sample report (Object Size Example).

```
 Size of object which where touched during the STRPEX run.
 Note: this is not the ″size touched″, but rather the gross obj/seg size
       of objects which were touched (at least once).


Object size   Segment start     Object/segment        Obj/Seg  Type description                    Library
(in bytes)    address           name                  type                                         name
 19,628,032   EE917707F7000000  PAG                    01EF    TEMPORARY - ACCESS GROUP
 16,777,216   FFFFFFFFC1000000  L/L RANGE 1            0000    L/L RANGE 1
 16,777,216   F1355BE79D000000  QCAWAREA               19EF    TEMPORARY - SPACE
 14,172,160   E9890758DA000000  P23XWY32E A960123A     1AEF    TEMPORARY - PROCESS CTL SPACE
       1
 13,647,872   21AA57F966000000  CSTFIL    CSTFIL       0B90    COMPOSITE PIECE - DATA SPACE        PFREXP
 11,800,576   250AFFDED4000000  QWCBT01                19D0    WORK CONTROL BLOCK TABLE            QSYS
 10,522,624   1CBD43CBE5000000  ITMFIL    ITMFIL       0B90    COMPOSITE PIECE - DATA SPACE        PFREXP
       2
  1,060,864   30C6219DFC000000  CSTFIL    CSTFIL       0C90    COMPOSITE PIECE - DATA SPACE INDEX
```

Figure 54. Finding SETOBJACC Candidates - Object Size Example

Look for object name and types that match those identified as SETOBJACC candidates.

What to look for:

1 This is the size in bytes of the data in PF CSTFIL member CSTFIL at the time PEX TRACE was run.

2 This is the size in bytes of the index for PF CSTFIL member CSTFIL at the time PEX TRACE was run.

Before deciding on the specific file (or file index) to be specified on the SETOBJACC command, we recommend you use a tool such as the Display File Description (DSPFD) command to check that there are few deleted records in the file (or files) you intend to place in memory. If you see a large number of deleted records (over 50), consider doing a Reorganize Physical File Member (RGZPFM) command to compress out the deleted record space.

9.2 Are Full Opens Causing High CPU Utilization?

One of the largest impacts to AS/400 performance is an excessive amount of file (usually a database file) opens and closes over a relatively short time period. Sometimes an application is ported to the AS/400 from a system where a file open uses much less system resource compared to the AS/400. It is not always easy to determine if an excessive file open rate is a cause of poor performance.

9.2.1 Purpose

Determine whether the amount of system resource being spent on doing full file opens can be reduced. Perhaps you have used the Performance Monitor and notice a high rate of synchronous NDB reads occurring on your system and want to explore whether these are occurring because of a high rate of full file opens. Perhaps you cannot understand the high level of CPU utilization on your system given your knowledge of what business functions the application is performing, and want to investigate whether application performance improvements can be made.

Full file opens continue to be a significant resource consumer on the RISC systems, just as they were on the CISC systems. Tests on a model 510 #2144 V3R6 system show that a shared file open uses approximately 20% of the CPU used to perform a full file open (results may vary by model). Thus, if you run an application that does **not** use shared opens, it is using approximately **five times more CPU** to open files than it uses if the files are opened as shared.

9.2.1.1 A Customer Experience

Management at a client site wanted application performance optimized in order to position them for significant growth and asked IBM Services to perform an application performance investigation.

The application was running on a V3R1 CISC four-way system; the full file open rate was found to exceed 180 per second. SMTRACE, the PEX TRACE predecessor tool on CISC, was used to identify which files were being opened how many times by which jobs. Database files formed the majority of the full file opens.

The interactive jobs were opening the same database files many times within the five-minute tracing period. Shared file opens were introduced, reducing the full file open rate to about 15 per second. Total CPU utilization reduced by over 30% was sustained when this change was implemented, since the full file opens/sec rate had been so high and was subsequently reduced to an acceptable level.

9.2.2 What Data to Collect

It is necessary to determine what rate of full opens is occurring on the system. This can be done using either Enhanced PEX TRACE or PEX STATS. However, it is easier to do this using Enhanced PEX TRACE than it is with PEX STATS.

Ensure that you pick a time for data collection that is after the users have signed on to the system and not during a shift change. Pick a time when any application startup programs (that may be doing many opens as part of user sign-on) have completed.

Once the rate of opens has been determined, Enhanced PEX TRACE is necessary to identify program names, files, and jobs involved in the opens.

9.2.3 How to Produce the Reports

This can be done by collecting data for all jobs using Enhanced PEX TRACE or PEX STATS as follows:

1. Enhanced PEX TRACE:

 Using Enhanced PEX enables you to determine **both** the rate of full opens and which programs, files, and jobs are involved.

 a. Use Menu PEXTRC01, Option 2 to Start PEX TRACE with the following values against the SMTBCH command keywords. Please refer to Figure 27 on page 134 for an explanation of the SMTBCH command.

      ```
      PROBLEM(*OPENS) DURATION(10) PRTPEX(*YES) MIBRACKET(*ENTRYEXIT)
      ```

 Note that MIBRACKET(*ENTRYEXIT) is not necessary to obtain an overall count of full opens; however, it is necessary if you want to investigate these opens by **program** name.

 b. Use PEX Reports Menu, PEXTRC02, Option 1 for Full File Open reports. This runs the OPENS command; ensure that you specify OPNPGM(*YES) so that application program names are available for detailed analysis **if** you collected MI *ENTRYEXIT information using the SMTBCH command. Please refer to Section 6.6.1, “OPENS Reporting Command” on page 147 for an explanation of the OPENS reporting command.

 c. Use Menu PEXTRC01 Option 8 to Display the PEX Trace Run Time. Please refer to Figure 33 on page 144 for an explanation of the DSPRUNINF command.

 Write down the number of seconds during which the trace was active.

 OR

2. PEX STATS:

 Using this method to find the full open rate per second involves more steps than using the PEX TRACE method. If the full open rate is high on your system, you still need to use PEX TRACE to pinpoint the programs and files involved.

 Follow the steps in the specified sequence.

 We need to identify the number of times that each of the system programs used for full opens was called:

 - QDBOPEN - full database file open
 - QSPOPEN - full spool file open
 - QTSOPEN - full DDM file open

- QWSOPEN - full workstation file open

a. ADDPEXDFN DFN(OPENS) DTAORG(*FLAT) MRGJOB(*YES) TEXT('Stats, Flat, All Jobs, Merge *YES')

 Ensure that you use DTAORG(*FLAT) MRGJOB(*YES) to get one total for each of the programs QDBOPEN, QWSOPEN, QSPOPEN and QTSOPEN.

b. STRPEX SSNID(OPENS) DFN(OPENS)

c. ENDPEX SSNID(OPENS)

d. PRTPEXRPT MBR(OPENS) STATSOPT(*PGMNAME)

 The report is in program name sequence to facilitate finding the QxxOPEN programs.

e. Using the Statistics Information section of the PEX STATS report adds together the number of "Times Called" for programs QDBOPEN, QWSOPEN, QSPOPEN, and QTSOPEN. This figure represents the total number of full opens during the measurement period.

 Now use the Run Information section to find the trace active time, where active time in seconds = (total time - suspend time/1000000).

 Divide the total opens by the number of seconds PEX was active for the rate of full opens per second.

9.2.3.1 Frequency of Data Collection

Consider at least three collections of PEX TRACE data to ensure that the results you are seeing are typical of "normal" system performance and not just the result of a "one-of-a-kind" operational environment. For example, one PEX TRACE collection may include a year-end payroll summary job and you need to understand if that job is in the data and if it should be included in the analysis.

Compare the results from the separate TRACEs to ensure that there is consistency. **Never** use data from one run only to make decisions about:

- Whether CPU spent doing full opens can be significantly reduced.
- Which files should be opened as shared.

9.2.4 Finding Full Opens Rate Per Second - PEX TRACE REPORT

The following report was produced using the OPENS command on the PEXTRC02 Reports Menu. Either *PERF or *OPENS must have been specified as the value against the PROBLEM keyword on the SMTBCH data collection command. However, only data related to full opens is collected with the *OPENS value. Therefore, the collection overhead is less than using the *PERF option.

```
07/24/96  12:17:43  Percent All Full Opens by Job  PAGE    1
Job                                  Full    Pct     TDE
                                     Opens   All
                                             Opens
                          1
P23XWY32G A960123A  052745             840   32.70   0000641D
                          1
BAD_BATCH A960123A  052763             669   26.04   000064B7
                          1
P23XWY32H A960123A  052744             631   24.56   0000641C
                          1
P23XWY32E A960123A  052752             416   16.19   0000645B
PEXTRACE  A960123A  052764               6     .23   000064B8
P23XWZ42E A960109B  052758               6     .23   000064B2
QBRMNET   QPGMR     050217               1     .04   0000014E
                      FINAL TOTALS
                      TOTAL          2,569   2
```

Figure 55. Full File Opens - Finding the Rate Per Second

9.2.4.1 Report Analysis

What to look for:

1 These jobs are responsible for a high number and percentage of full file opens during the trace period. Further investigation is required to determine why they are doing so many opens and if an application change can be made that could significantly improve performance.

2 This total represents the total number of full file opens occurring during the trace period. If you selected *ALL as the type of opens in which you are interested, this is equivalent to the sum of the number of calls made to programs:

- QDBOPEN - full database file open
- QWSOPEN - full workstation file open
- QSPOPEN - full spool file open
- QTSOPEN - full DDM file open

Follow these steps to find the rate of full opens per second:

1. Determine the active trace time using Option 8, Display PEX TRACE Run Time for a Session on the PEXTRC01 PEX TRACE Main Menu.

 For this example, active PEX TRACE run time was:

   ```
   Run time for trace session OPENS in library DHOPENS is 000000068 seconds.
   ```

2. Divide the total number of opens by the number of seconds for which the trace was active.

 For this example, the rate of full opens is:

   ```
   2,569 total opens / 68 seconds = 37.8 full opens per second
   ```

3. Find whether this rate is good or bad using the following table.

Table 14. Full File Open Guidelines

Resource Description	Good	Bad
Full File Opens per Second:		
- Model 510	<10	>40
- Model 530	<40	>160

Note: These guidelines refer to the number of full file opens occurring per second system-wide and should be used to determine whether or not there is room for releasing CPU currently spent performing this work. The full opens may be required by the application or the system may be able to process higher rates of full opens. These values are merely guidelines to call your attention to functions affecting performance that should receive additional investigation.

The numbers in this table do not represent physical limits achievable on the AS/400 system. They represent what is reasonable, given that the system is in a steady state (for example, users are staying signed-on and not doing sign-on/off) and given that appropriate file pre-opens are in use with SHARE(*YES).

We could not perform testing for a wide variety of model and feature numbers. So for other models, use the Relative Performance Rating (RPR) values or relative CPW values to interpolate for slower or faster models than the ones listed here.

This table is reproduced in Appendix E, “Performance Explorer Tables” on page 495 for ease of use when reviewing PRTPEXRPT output in the customer environment.

Since we collected our data on a 510-2144, our rate of opens (37.8/second) approaches the Bad category. We need to investigate further to see where improvements can be made. We must now review the other queries produced by the OPENS command.

The first four jobs on the query in Figure 55 on page 200 marked as **2** are doing most of the opens. If your system has jobs that are significantly ″out of line″ (appear to be using more CPU or doing more DASD I/Os or doing more file opens than is reasonable), the programs being used by these jobs need investigation first.

Remaining at a high level view, we now see system-wide which programs are causing these opens.

```
07/24/96  12:17:48  Percent All Full Opens by Program  PAGE    1
Program             Full    Pct
                    Opens   ALL
                            Opens
OPEN5               1,749   68.08  1
TESTIO                602   23.43  1
OPN132                198    7.71  2
QDMCOPEN               11     .43
OPENGOOD                5     .19
GPHPGM2                 4     .16
      FINAL TOTALS
      TOTAL         2,569
```

Figure 56. Percent All Full Opens by Program - Example

Note:

1 Programs OPEN5 and TESTIO are doing 91% of all the opens.

We must now check whether programs OPEN5 and TESTIO are being used by any ″out of line″ jobs, such as those marked **2** in Figure 55 on

page 200. We need to find out whether these programs are opening the same files many times or opening lots of different files a few times only.

2 At 7.7% of all opens, program OPN132 must also be investigated.

Next, we look at a breakdown of what programs our jobs are using.

```
07/24/96  12:17:45  Percent All Full Opens by Program within Job  PAGE    1
Job                         Program             Full    Pct     TDE
                                                Opens   ALL
                                                        Opens
                                 1                       2
P23XWY32G A960123A  052745  OPEN5                 750   29.19   0000641D
                                 1                       2
BAD_BATCH A960123A  052763  OPEN5                 669   26.04   000064B7
                                 1                       2
P23XWY32H A960123A  052744  OPEN5                 330   12.85   0000641C
                                 3
P23XWY32E A960123A  052752  TESTIO                301   11.72   0000645B
                                 3
P23XWY32H A960123A  052744  TESTIO                301   11.72   0000641C
                                 3
P23XWY32E A960123A  052752  OPN132                110    4.28   0000645B
                                 3
P23XWY32G A960123A  052745  OPN132                 88    3.43   0000641D
PEXTRACE  A960123A  052764  QDMCOPEN               6     .23   000064B8
P23XWY32E A960123A  052752  OPENGOOD               5     .19   0000645B
P23XWZ42E A960109B  052758  GPHPGM2                4     .16   000064B2
P23XWY32G A960123A  052745  QDMCOPEN               2     .08   0000641D
P23XWZ42E A960109B  052758  QDMCOPEN               2     .08   000064B2
QBRMNET   QPGMR     050217  QDMCOPEN               1     .04   0000014E
                                FINAL TOTALS
                                TOTAL          2,569
```

Figure 57. Full Opens by Program within Job - Example

Note the following programs:

1 Program OPEN5 is causing the majority of full opens in our "out of line" jobs. It also performs most opens system-wide, as marked by **2** in Figure 56 on page 201. We need to review what files these programs were opening.

2 Note that the total opens for these jobs by program OPEN5 is 1749 which matches the total opens for that program shown by **1** in Figure 56 on page 201. Thus, we have found all jobs using this program during the trace data collection.

3 Given that the trace period was 68 seconds, programs TESTIO and OPN132 are doing a lot of opens in this time; we need to see what files these programs were opening.

Having identified that programs OPEN5, TESTIO, and OPN132 are responsible for most of the opens on our system, we need to see what files these programs are using and whether they are opening the same files multiple times or opening many different files. The next example report provides these answers.

```
07/24/96  12:17:47  Percent All Full Opens by File within Program  PAGE    1
Program     File                          Full    Pct
                                          Opens   ALL
                                                  Opens
TESTIO      DSPOBJD   DSPOBJD    1          602   23.43
OPEN5       PF02      PF02       2          350   13.62
OPEN5       PF03      PF03       2          350   13.62
OPEN5       PF04      PF04       2          350   13.62
OPEN5       PF05      PF05       2          350   13.62
OPEN5       PF01      PF01       2          349   13.59
OPN132      PF132     DEBS       3           99    3.85
OPN132      PF132     DEBSSTS    3           99    3.85
QDMCOPEN    QPDSPSTS                         4     .16
GPHPGM2     GPHSMRYL  GPHSMRYL                2     .08
GPHPGM2     TESTPRT                          2     .08
QDMCOPEN    PEXTRC01                         2     .08
QDMCOPEN    PF132     OPENSSTS               2     .08
QDMCOPEN    QDPTDSP                          2     .08
OPENGOOD    PF01      PF01                   1     .04
OPENGOOD    PF02      PF02                   1     .04
OPENGOOD    PF03      PF03                   1     .04
OPENGOOD    PF04      PF04                   1     .04
                                                 M05


07/24/96  12:17:47  Percent All Full Opens by File within Program  PAGE    2
Program     File                          Full    Pct
                                          Opens   ALL
                                                  Opens
OPENGOOD    PF05      PF05                   1     .04
QDMCOPEN    QA1ANET   QA1ANET                1     .04
                      FINAL TOTALS
                      TOTAL              2,569
```

Figure 58. Full Opens by File within Program - Example

Note:

Note that we do not see the library name of the file being opened, only the file name and member name.

1 Program TESTIO opened file DSPOBJD member DSPOBJD 602 times in 68 seconds.

2 Program OPEN5 appears to fully open files PF01, PF02, PF03, PF04, and PF05 each time it is called.

3 Program OPN132 is opening file PF132 198 times in total; however, it is opening two different members, DEBS and DEBSSTS, 99 times each.

Discussion: The jobs marked as **2** in Figure 55 on page 200 are prime candidates for the implementation of shared opens. The files used by programs OPEN5, TESTIO, and OPN132 should be opened as shared in these jobs, marked as **1**, **2**, and **3** respectively in Figure 58.

Be aware that a report is available showing total full opens by file in descending sequence system-wide. This is most useful for identifying which files should be opened as shared. Please refer to Section 10.1.2, “Report Title - Percent Full xxx Opens by File” on page 250 for an example of this report. Please refer to Section 10.1, “Full File Opens (OPENS Command)” on page 249 for examples of **all** reports produced from the OPENS command.

When implementing shared file opens, also known as shared open data paths, remember the following points:

1. Code:

```
OVRDBF FILE(filename) SHARE(*YES) 1
OPNDBF FILE(filename) OPNOPT(nnn) 2  3
```

1 This statement has an additional keyword, override scope OVRSCOPE, that defaults to ″activation group defined.″ This default causes the override to exist/be visible at the CALL level when the override is issued in the default activation group and causes the override to exist/be visible at the ACTIVATION GROUP level when issued in a non-default ILE activation group.

2 This statement has an additional keyword, open scope OPNSCOPE, whose default value of ′activation group defined′ causes the open to exist/be visible at the CALL level when run in the default activation group and causes the open to exist/be visible at the ACTIVATION GROUP level when run outside the default activation group.

This means that the file sharing characteristics of a full function ILE program (an ILE program **not created** using CRTBNDPGM..DFTACTGRP(*YES)) is **different** depending on whether the program is run in the default activation group or in a non-default activation group.

For further information, refer to the *ILE Concepts Manual* and the redbook *Moving to ILE for RPG IV Programmers*, GG24-4358.

3 Note that if the file to be shared is used for both input and output by programs in the job, you must specify OPNOPT(*ALL). However, if the file is actually used for input only, you should use OPNOPT(*INP) to ensure that the system tries to maximize default blocking.

2. Once a file is opened as shared, there is only one file cursor.

 This may require programming changes if shared files were not being used.

 For example, assume PGMA is doing sequential reads on file PF1 and last read record 8. At this time the file cursor is positioned so that record 9 would be read if a sequential read were the next read operation to the file. PGMA calls program PGMB and PGMB does another operation, such as a random read against record 54, and then returns to program PGMA. When PGMA issues its next read sequential operation, it reads record 55 and not record 9. Thus, you should inspect the application to check whether this situation can occur and make appropriate coding changes to ensure that the calling program does not have its file cursor repositioned to an unexpected value by a called program.

9.3 Are Activation Group Creates/Deletes Causing High CPU Utilization?

In application environments where there may be a large number of calls to ILE programs, an excessive rate of activation group creates and deletes may degrade performance.

9.3.1 Purpose

Determine whether the amount of system resource being spent on doing activation group creates/deletes is reduced. Perhaps you have used the Performance Monitor trace and noticed high CPU against certain ILE programs.

If your application is built using an ILE language, but the programs were built using the Create Bound Program command CRTBNDxxx DFTACTGRP(*YES) (performs both a compile of a module and a bind of that module into a program), the DFTACTGRP(*YES) setting ensures that your program can only run in the default activation group that always exists for every job. In this case, CPU

cannot be saved through activation group analysis as your application only uses the default activation group, which is created at job initiation and cannot be deleted. It is only full-function ILE programs built with an activation group attribute of *NEW or NAMED using either the Create Program (CRTPGM) command or CRTBNDPGM command that should be reviewed using this section.

Heavy activation group create/delete activity can occur due to any of the following reasons:

1. An ILE program created with an activation group attribute of *NEW being frequently called and returned from within a job:

 A ″create activation group″ trace event is reported each time this program is called. The activation group delete is, however, implicit to the program through the ACTGRP(*NEW) attribute, so the ″delete activation group″ trace event is reported against the CALLER of the program and not against this program itself.

 Each time the program is called, an ″activate program″ event is reported. The ″deactivate program″ is, however, implicit through the ACTGRP(*NEW) attribute, so a ′deactivate program′ event is **not reported** when this program returns control to the caller.
2. Inappropriate use of the Reclaim Activation Group (RCLACTGRP) command to delete activation groups that should be left around in a job for later use:

 A ″delete activation group″ trace event is reported for each activation group deleted by the program issuing the RCLACTGRP command.

 Beware of applications using RCLACTGRP ACTGRP(*ELIGIBLE) as these cause **any** activation groups in a job that do not have procedures on the call stack to be deleted and these other activation groups may be for a DIFFERENT application.
3. Inappropriate use of the ″End Run Unit″ bindable APIs CEETREC (end run unit normal) and CEE4ABN (end run unit abnormal):

 These APIs exist to enable controlled cleanup of ILE resources such as activation groups and activated programs within a job.

9.3.2 What Data to Collect

It is necessary to determine what rate of activation group creation is occurring on the system. This can be done using either Enhanced PEX TRACE or PEX STATS. This example concentrates on Enhanced PEX TRACE.

Please refer to Table 13 on page 168 for the types of data to collect using the SMTBCH command that enables activation group analysis through the ACTGRP command.

Once the rate of activation group creates has been determined, Enhanced PEX TRACE is the easiest tool to use to identify the program names causing activation group creation **system-wide**.

9.3.3 How to Produce the Reports

Use Enhanced PEX TRACE to collect the data. This enables you to determine the rate of activation group creation per second and identify which programs are causing excessive activation group create activity.

1. Use Option 2 on the PEXTRC01 menu to Start Enhanced PEX TRACE with the following values for the SMTBCH command keywords. See Section 6.4.3,

"Collecting Enhanced PEX TRACE Data" on page 133 for a description of the SMTBCH command parameters.

```
PROBLEM(*ACTGRP) DURATION(10) PRTPEX(*YES) MIBRACKET(*NONE)
```

Note that MIBRACKET(*ENTRYEXIT) is not necessary to obtain the application program names performing activation group creations.

2. Use Option 3 on the PEX Reports Menu, PEXTRC02, for Activation Group Creates. This runs the ACTGRP command.

 See Section 6.6.3, "ACTGRP Reporting Command" on page 153 for a description of the ACTGRP command.

3. Use Option 8 on the PEXTRC01 menu to Display the Enhanced PEX Trace Run Time. Write down the number of seconds during which the trace was active.

9.3.3.1 Frequency of Data Collection

Consider at least three collections of Enhanced PEX TRACE data to ensure that the results you are seeing are typical of ″normal″ system performance and not just the result of a ″one-of-a-kind″ operational environment. Avoid collecting data at start of day, shift change or end of day working times.

Compare the results from the separate TRACEs to ensure that there is consistency.

9.3.4 Finding Activation Group Create Rate Per Second - PEX TRACE REPORT

In this example, a total of six ILE programs were run. There are three pairs of ILE CL and ILE RPG programs each of which perform identical functions; the only difference between these programs is the activation group attribute on the ILE RPG programs.

ILE CL program ILEAGNEW was created to run in activation group name NEW; it called ILE RPG program ILEAGN 100 times. Program ILEAGN was created to run in a **new** activation group.

ILE CL program ILEAGCALLR was created to run in activation group name CALLER; it called ILE RPG program ILEAGC 100 times. Program ILEAGC was created to run in the activation group name of the calling program, thus, it ran in activation group CALLER.

ILE CL program ILEAGNAMED was created to run in activation group name NAMED; it called ILE RPG program ILEAGM 100 times. Program ILEAGM was created to run in activation group name NAMED1.

These programs were run in a single job.

The following report was produced using the ACTGRP command on the PEXTRC02 Reports Menu. Either *PERF or *ACTGRP must be specified as the value against the PROBLEM keyword on the SMTBCH data collection command; however, only data related to activation groups is collected with the *ACTGRP value. Therefore, the collection overhead is less than using the *PERF option.

```
08/05/96  09:35:59  Activation Group Creates by Job  PAGE    1
Job                               ACTGRP   Pct ALL   TDE
                                  Creates  ACTGRP
                                           Creates
P23XWY32E A960123A  053703            104   100.00   000092B9
                      FINAL TOTALS
                      TOTAL             104   1
```

Figure 59. Activation Group Creates - Finding the Rate Per Second

9.3.4.1 Activation Group TRACE Report Analysis

What to look for:

1 This total represents the total number of activation group creations occurring system-wide during the trace period.

Note that in this example there is only one job.

Follow these steps to find the rate of activation group creates per second:

1. Determine the active trace time using Option 8, Display Enhanced PEX TRACE Run Time for a Session on the PEXTRC01 Enhanced PEX TRACE menu.

 For this example, active Enhanced PEX TRACE run time was:

   ```
   Run time for trace session AGTRACE in library DHPEX is 000000028 seconds.
   ```

2. Divide the total number of activation group creates by the number of seconds for which the trace was active.

 For this example, the rate of activation group creates is:

   ```
   104 / 28 seconds = 3.7 activation group creates per second
   ```

Consider the rates in the following table when determining whether or not to make changes to an application performing a lot of activation group creates.

Table 15. Activation Group Creates per Second Guidelines

Model	Maximum Rate Per Second[1]	Maximum Rate Per Second[2]
510 - 2144	55	2.7
530 - 2153	440	22

Note:

[1] = These figures represent 100% CPU being used to perform activation group creates.

[2] = These figures represent 5% CPU being used to perform activation group creates.

We could not perform testing for a wide-variety of model and feature numbers. So for other models, use the Relative Performance Rating (RPR) values or relative CPW values to interpolate for slower or faster models than the ones listed here.

This table is reproduced in Appendix E, “Performance Explorer Tables” on page 495 for ease of use when doing performance analysis.

Since our example reports were generated on a 510 #2144, we are spending more than 5% of our total CPU on the activation group create/deletes (in this case, being performed by a single job). We need to investigate further to see

where improvements can be made. Specifically, we need to find out which programs called in this job caused all the activation groups to be created.

```
                                        Activation Group Creates - Part 3 (Job/Pgm

08/05/96  09:35:59  Activation Group Creates by Program within Job   PAGE    1
Job                        Program Causing        ACTGRP   Pct ALL   TDE
                           ACTGRP Creation        Creates  ACTGRP
                                                           Creates
P23XWY32E A960123A  053703    ILEAGN          1        100    96.15   000092B9
P23XWY32E A960123A  053703    ILEAGCALLR      2          1      .96   000092B9
P23XWY32E A960123A  053703    ILEAGM          2          1      .96   000092B9
P23XWY32E A960123A  053703    ILEAGNAMED      2          1      .96   000092B9
P23XWY32E A960123A  053703    ILEAGNEW        2          1      .96   000092B9
                                       FINAL TOTALS
                                       TOTAL            104
```

Figure 60. Activation Group Creates by Program within Job Example

Note the following:

1 Program ILEAGN is responsible for 100 of the 104 activation group creates in this job.

The activation group in which program ILEAGN runs is continually being deleted. This can be for one of two reasons:

1. Program ILEAGN has activation group *NEW as is being repeatedly called within the job. In this case, program ILEAGN is directly responsible for the performance overhead.
2. The activation group in which program ILEAGN runs is continually being deleted by some other program in the job, thus causing program ILEAGN to be implicitly deactivated. Note that the activation group in which program ILEAGN runs can only be deleted when there are no programs/procedures on the call stack for that activation group.

 This situation occurs when another program in the job issues either the RCLACTGRP command against the activation group in which program ILEAGN is running or issues a bound call to an ″end run unit″ API and program ILEAGN is in the run unit that is being ended.

 In this situation, program ILEAGN has an activation group attribute other than *NEW and is not directly responsible for the performance overhead. We must find which program is issuing the RCLACTGRP or ″end run unit″.

First, use the DSPPGM command to check the activation group attribute on program ILEAGN. In this case, it was *NEW, meaning that each time the program was called a new activation group is built before the program is run. We can conclude that this program was called 100 times in the job and should certainly not be created with activation group *NEW if it is being invoked this frequently.

2 These programs each caused one activation group to be created during the 28-second trace period. If the rate of activation group creates were high (say greater than 5% of the available CPU), and a few programs were not responsible for most of these creates, we have to inspect all programs doing activation group creates and identify the cause. In this example, however, we have already found the problem in **1**.

9.3.4.2 Activation Group STATS Report Analysis

Activation group analysis is significantly more difficult using PEX STATS than it is using Enhanced PEX TRACE.

Use STATS FLAT over all jobs to determine the rate of activation group creates by finding the number of calls to program QWVPDAGE (destroy activation group exit router) and dividing by the trace time.

STATS HIER MRGJOB(*NO) must be used for individual ″who called who″ program flow analysis within a job. Note that the call levels shown in PEX STATS HIER reports do not match the call levels used within the job. The call levels on the PEX STATS HIER report are reconstructed from collected data. This means that, when an ILE application is enabled for performance collection at the PEP level, the call stack numbers do not reflect calls to service program procedures.

Important!

Be aware that activation group creates are reported against the caller of the program causing them. This makes activation group create analysis difficult using PEX STATS.

Use Enhanced PEX TRACE to perform activation group analysis wherever possible.

Use of PEX STATS HIER MRGJOB(*NO), which keeps separate CPU counters for each job/program combination, is likely to be a much greater overhead than using Enhanced PEX TRACE. Try to limit using PEX STATS HIER for tracing a single job only and avoid using against all jobs on the system.

This example is included in order to prove that it is much more difficult to perform activation group analysis using PEX STATS than it is using Enhanced PEX TRACE.

```
Library . . : DHPEX
Member. . . : AG001
Description : ACTGRP - STATS HIER ONE JOB
Type . . . . . : STATISTICS
Definition Name. . . . . : AGS
Defined By . . . . . : A960123A
Definition Description . . . : *BLANK
Data Organization. . . . . : HIER
Overhead Subtraction . . . . : YES
Merge Jobs . . . . . : NO
Include Dependent Jobs . . . : YES
Selected Jobs:
    Name       User       Number
    *
   (lines removed for brevity)
```



```
Library . . : DHPEX
Member. . . : AG001
Description : ACTGRP - STATS HIER ONE JOB
                              +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
             Times   Calls MI CPLX             CPU        DB    DB   NDB   NDB             CPU        DB    DB   NDB   NDB  Call
Name        Called    Made  Issued          (us) /   %    SIO   AIO   SIO   AIO          (us) /   %    SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
**LIC Task       0       0       0         50,751  2.4      0     0     0     0         50,751  2.4      0     0     0     0     0
**Unknown        0       0       0         58,639  2.8      0     0     0     0         58,639  2.8      0     0     0     0     0
  (lines removed for brevity)
```



```
Library . . : DHPEX
Member. . . : AG001
Description : ACTGRP - STATS HIER ONE JOB
                              +----------------- Inline Stats ------------++-------------- Cumulative Stats -----------+
                                                                                                                          13
             Times   Calls MI CPLX             CPU        DB    DB   NDB   NDB             CPU        DB    DB   NDB   NDB  Call
Name        Called    Made  Issued          (us) /   %    SIO   AIO   SIO   AIO          (us) /   %    SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
  (lines removed for brevity)
QCACALL          1       0       4            88  0.0      0     0     0     0            622  0.0      0     0     0     0     1
*RSLVSP          1       0       0           322  0.0      0     0     0     0            322  0.0      0     0     0     0     2
*MATSOBJ         1       0       0           161  0.0      0     0     0     0            161  0.0      0     0     0     0     2
*LOCKSL          1       0       0            31  0.0      0     0     0     0             31  0.0      0     0     0     0     2
*UNLOCKSL        1       0       0            19  0.0      0     0     0     0             19  0.0      0     0     0     0     2
                                                 1                                                2
ILEAGNEW         1     303     800     1,570,737 75.7      0     0     7     0      1,741,446 83.9      0     0     7     0     1
    ILEAGNEW/_CL_PEP
     14
*Alias           0       0       0             0  0.0      0     0     0     0              0  0.0      0     0     0     0     2
QCLRSLV          1       1      13           284  0.0      0     0     0     0            609  0.0      0     0     0     0     3
*MATINVAT        1       0       0            76  0.0      0     0     0     0             76  0.0      0     0     0     0     4
*MATPTRIF        1       0       0            40  0.0      0     0     0     0             40  0.0      0     0     0     0     4
QLIADOPT         1       0       1            14  0.0      0     0     0     0             75  0.0      0     0     0     0     4
*RSLVSP          1       0       0            61  0.0      0     0     0     0             61  0.0      0     0     0     0     5
*DEQ             6       0       0            73  0.0      0     0     0     0             73  0.0      0     0     0     0     4
*ENQ             5       0       0            58  0.0      0     0     0     0             58  0.0      0     0     0     0     4
QCLCLCPR       100       0     400         9,699  0.5      0     0     0     0         58,999  2.8      0     0     0     0     3
*RSLVSP        100       0       0        34,945  1.7      0     0     0     0         34,945  1.7      0     0     0     0     4
*MATSOBJ       100       0       0         8,497  0.4      0     0     0     0          8,497  0.4      0     0     0     0     4
*LOCKSL        100       0       0         3,631  0.2      0     0     0     0          3,631  0.2      0     0     0     0     4
*UNLOCKSL      100       0       0         2,224  0.1      0     0     0     0          2,224  0.1      0     0     0     0     4
                                                 3                                                4
ILEAGN         100       0     100         8,605  0.4      0     0     0     0         18,946  0.9      0     0     0     0     3
    ILEAGN/_QRNP_PEP_ILEAGN
     14
*Alias           0       0       0             0  0.0      0     0     0     0              0  0.0      0     0     0     0     4
*SNDPRMSG      100       0       0        10,340  0.5      0     0     0     0         10,340  0.5      0     0     0     0     5
*MATPTR        200       0       0         6,340  0.3      0     0     0     0          6,340  0.3      0     0     0     0     3
*MATINVAT      200       0       0         6,406  0.3      0     0     0     0          6,406  0.3      0     0     0     0     3
*MATINVIF      200       0       0         4,214  0.2      0     0     0     0          4,214  0.2      0     0     0     0     3
```

Figure 61 (Part 1 of 3). Activation Group PEX STATS Example

Library . . : DHPEX
Member. . . : AG001
Description : ACTGRP - STATS HIER ONE JOB

Name	Times Called	Calls Made	MI	CPLX Issued	Inline Stats CPU (us) / %	Inline Stats DB SIO	Inline Stats DB AIO	Inline Stats NDB SIO	Inline Stats NDB AIO	Cumulative Stats CPU (us) / %	Cumulative Stats DB SIO	Cumulative Stats DB AIO	Cumulative Stats NDB SIO	Cumulative Stats NDB AIO	Call Level
	5														
*INVP	100	0	0		738 0.0	0	0	0	0	738 0.0	0	0	0	0	
	5														
QWVPDAGE	100	100	0		2,974 0.1	0	0	0	0	73,105 3.5	0	0	0	0	
	5														
QDMRCLSE	100	400	0		16,270 0.8	0	0	0	0	70,130 3.4	0	0	0	0	
	5														
QUIRCLAP	100	0	0		2,236 0.1	0	0	0	0	2,236 0.1	0	0	0	0	
	5														
QOLCLNUP	100	0	0		2,289 0.1	0	0	0	0	2,289 0.1	0	0	0	0	
	5														
QSQENDAG	100	0	0		47,530 2.3	0	0	0	0	47,530 2.3	0	0	0	0	
	5														
QCNSMCTL	100	0	0		1,729 0.1	0	0	0	0	1,729 0.1	0	0	0	0	
	5														
*DESAGP	100	0	0		1,053 0.1	0	0	0	0	1,053 0.1	0	0	0	0	
QCLRTNE	1	0	0		25 0.0	0	0	0	0	25 0.0	0	0	0	0	3
QCLCLNUP	1	0	4		117 0.0	0	0	0	0	270 0.0	0	0	0	0	3
*MATPTR	1	0	0		26 0.0	0	0	0	0	26 0.0	0	0	0	0	4

(lines removed for brevity)

Library . . : DHPEX
Member. . . : AG001
Description : ACTGRP - STATS HIER ONE JOB

Name	Times Called	Calls Made	MI	CPLX Issued	Inline Stats CPU (us) / %	Inline Stats DB SIO	Inline Stats DB AIO	Inline Stats NDB SIO	Inline Stats NDB AIO	Cumulative Stats CPU (us) / %	Cumulative Stats DB SIO	Cumulative Stats DB AIO	Cumulative Stats NDB SIO	Cumulative Stats NDB AIO	Call Level
QCACALL	1	0		4	83 0.0	0	0	0	0	553 0.0	0	0	0	0	3
*RSLVSP	1	0		0	314 0.0	0	0	0	0	314 0.0	0	0	0	0	4
*MATSOBJ	1	0		0	97 0.0	0	0	0	0	97 0.0	0	0	0	0	4
*LOCKSL	1	0		0	33 0.0	0	0	0	0	33 0.0	0	0	0	0	4
*UNLOCKSL	1	0		0	24 0.0	0	0	0	0	24 0.0	0	0	0	0	4
					6					7					
ILEAGNAMED	1	203		0	12,248 0.6	0	0	6	0	76,056 3.7	0	0	6	0	3
ILEAGNAMED/_CL_PEP															
14															
*Alias	0	0		0	0 0.0	0	0	0	0	0 0.0	0	0	0	0	4
QCLRSLV	1	1		13	276 0.0	0	0	0	0	601 0.0	0	0	0	0	5
*MATINVAT	1	0		0	82 0.0	0	0	0	0	82 0.0	0	0	0	0	6
*MATPTRIF	1	0		0	38 0.0	0	0	0	0	38 0.0	0	0	0	0	6
QLIADOPT	1	0		1	13 0.0	0	0	0	0	64 0.0	0	0	0	0	6
*RSLVSP	1	0		0	51 0.0	0	0	0	0	51 0.0	0	0	0	0	7
*DEQ	6	0		0	76 0.0	0	0	0	0	76 0.0	0	0	0	0	6
*ENQ	5	0		0	62 0.0	0	0	0	0	62 0.0	0	0	0	0	6
QCLCLCPR	100	0		400	7,863 0.4	0	0	0	0	48,146 2.3	0	0	0	0	5
*RSLVSP	100	0		0	29,469 1.4	0	0	0	0	29,469 1.4	0	0	0	0	6
*MATSOBJ	100	0		0	6,732 0.3	0	0	0	0	6,732 0.3	0	0	0	0	6
*LOCKSL	100	0		0	2,448 0.1	0	0	0	0	2,448 0.1	0	0	0	0	6
*UNLOCKSL	100	0		0	1,578 0.1	0	0	0	0	1,578 0.1	0	0	0	0	6
	8				9										
ILEAGM	100	0		0	3,795 0.2	0	0	0	0	3,795 0.2	0	0	0	0	5
ILEAGM/_QRNP_PEP_ILEAGM															
8															
QCLRTNE	1	0		0	25 0.0	0	0	0	0	25 0.0	0	0	0	0	5
QCLCLNUP	1	0		4	116 0.0	0	0	0	0	257 0.0	0	0	0	0	5

Figure 61 (Part 2 of 3). Activation Group PEX STATS Example

```
Library . . : DHPEX
Member. . . : AG001
Description : ACTGRP - STATS HIER ONE JOB
                                  +----------------- Inline Stats ------------++------------- Cumulative Stats -----------+
             Times   Calls MI CPLX          CPU        DB    DB   NDB   NDB            CPU        DB    DB   NDB   NDB  Call
Name        Called    Made  Issued       (us) /   %    SIO   AIO   SIO   AIO       (us) /   %    SIO   AIO   SIO   AIO Level
-------------------------------------------------------------------------------------------------------------------------------
 (lines removed for brevity)
QCACALL          1       0       4          85  0.0      0     0     0     0          546  0.0      0     0     0     0     5
*RSLVSP          1       0       0         314  0.0      0     0     0     0          314  0.0      0     0     0     0     6
*MATSOBJ         1       0       0          91  0.0      0     0     0     0           91  0.0      0     0     0     0     6
*LOCKSL          1       0       0          34  0.0      0     0     0     0           34  0.0      0     0     0     0     6
*UNLOCKSL        1       0       0          19  0.0      0     0     0     0           19  0.0      0     0     0     0     6
                                                [10]                                      [11]
ILEAGCALLR       1     203       0       8,024  0.4      0     0     0     0       62,268  3.0      0     0     0     0     5
    ILEAGCALLR/_CL_PEP
     [14]
*Alias           0       0       0           0  0.0      0     0     0     0           0  0.0      0     0     0     0     6
QCLRSLV          1       1      13         265  0.0      0     0     0     0          593  0.0      0     0     0     0     7
*MATINVAT        1       0       0          80  0.0      0     0     0     0           80  0.0      0     0     0     0     8
*MATPTRIF        1       0       0          41  0.0      0     0     0     0           41  0.0      0     0     0     0     8
QLIADOPT         1       0       1          13  0.0      0     0     0     0           69  0.0      0     0     0     0     8
*RSLVSP          1       0       0          55  0.0      0     0     0     0           55  0.0      0     0     0     0     9
*DEQ             6       0       0          75  0.0      0     0     0     0           75  0.0      0     0     0     0     8
*ENQ             5       0       0          60  0.0      0     0     0     0           60  0.0      0     0     0     0     8
QCLCLCPR       100       0     400       7,881  0.4      0     0     0     0       49,744  2.4      0     0     0     0     7
*RSLVSP        100       0       0      29,768  1.4      0     0     0     0       29,768  1.4      0     0     0     0     8
aMATSOBJ       100       0       0       6,928  0.3      0     0     0     0        6,928  0.3      0     0     0     0     8
*LOCKSL        100       0       0       3,112  0.1      0     0     0     0        3,112  0.1      0     0     0     0     8
*UNLOCKSL      100       0       0       2,052  0.1      0     0     0     0        2,052  0.1      0     0     0     0     8
               [12]
ILEAGC         100       0       0       3,650  0.2      0     0     0     0        3,650  0.2      0     0     0     0     7
    ILEAGC/_QRNP_PEP_ILEAGC
               [12]
QCLRTNE          1       0       0          25  0.0      0     0     0     0           25  0.0      0     0     0     0     7
QCLCLNUP         1       0       4         102  0.0      0     0     0     0          231  0.0      0     0     0     0     7
```

Figure 61 (Part 3 of 3). Activation Group PEX STATS Example

Note the following:

STATS HIER was run over a single job to produce this example.

PEX STATS accumulates CPU used within a program. If an ILE program has been created with activation group *NEW and is called multiple times within a job, the CPU overhead of activation group creation is charged to the caller of the ILE program and **not against the ILE program causing the CPU overhead (the activation group creation).** This is because the activation group needed to run a program is created **before** the program itself is activated. Thus, the CPU for activation group creation can only be charged to the caller as the called program may not be active at the time the CPU accounting occurs.

This is a simple example with data captured over a single job running a total of six programs. In a production environment with hundreds or thousands of programs, we need another tool to identify the programs **causing** the activation group creations; the only tool that does this is Enhanced PEX TRACE.

1 Application program CPU analysis involves checking:

1. **Cumulative CPU**

 The CPU used by the program and all other application programs it called (that ran at a lower call stack level).

2. **Direct CPU**

The CPU used by the program, excluding any other application programs it called.

The direct CPU for program ILEAGNEW was high at 75.7% of the total CPU used by the job (as in the Total CPU line of the Stats CPU Summary Information for the job immediately preceding the Library Section and after the Task Information Section and **not** the one at the beginning of a PEX STATS HIER report).

In this case, this CPU is not actually being caused by statements in program ILEAGNEW; it is being caused by the call to program ILEAGN, where a new activation group must be built to run program ILEAGN and is deleted **every one of the 100 times** program ILEAGN is called. This is because the new activation group is built **before** program ILEAGN is invoked (its PEP is not yet on the call stack) so the CPU cannot be charged against program ILEAGN and gets charged against its caller, ILEAGNEW.

2 The cumulative CPU for program ILEAGNEW was 82.8% of the job′s CPU. Since most of the CPU is in the direct figure, this indicates that there may be a problem within program ILEAGNEW.

This can be misleading in an ILE application environment.

We know from **1** that it is the activation group attribute of program ILEAGN that is causing the problem and that program ILEAGNEW is not a problem (it is showing up as one in STATS because of the way CPU accounting works).

3 Program ILEAGN is called 100 times from program ILEAGNEW. Its direct CPU is 0.4% of the job′s CPU, indicating that there is no problem with this program. While there is no direct problem with the contents of program ILEAGN, there is a problem with the program creation option of activation group *NEW.

Conclude that for programs frequently invoked within a job, you should check that the activation group attribute is not *NEW.

4 Cumulative CPU for program ILEAGN is 0.9% of the job′s CPU. This does not appear to be a major contributor to the 82.8% cumulative figure shown for program ILEAGNEW in **2**.

5 These programs are called as part of activation group deletion. Program QWVPDAGE (Destroy activation group entry) always occurs as part of activation group deletion. In addition, the MI complex instruction *DESAGP is always run as part of activation group deletion irrespective of how the activation group is being deleted (through *NEW, RCLACTGRP, or ″end run unit″).

Note that these activation group delete processing programs are run after program ILEAGN.

6 The direct CPU for program ILEAGNAMED is low, indicating that there is no problem with this program.

7 The cumulative CPU for program ILEAGNAMED is low, indicating that there is no problem with this program. Contrast this figure of 3.7% of the job′s CPU with the 83.9% figure in **2** for program ILEAGNEW.

8 Program ILEAGM is called from program ILEAGNAMED 100 times. Note that the delete activation group programs present after program ILEAGN in **5** are not present here. This indicates that program ILEAGM was created with an activation group attribute of either *CALLER or ″named″.

9 Note that the direct CPU for program ILEAGM is smaller than the direct CPU for program ILEAGN in **3**. Both programs perform identical functions, the only difference is the activation group attribute (which cannot be detected using PEX STATS). We needed to use the DSPPGM command to detect this difference.

10 The direct CPU for program ILEAGCALLR is low, indicating that this program is not a problem. Contrast this figure of 0.4% CPU with the 0.6% CPU for program ILEAGNAMED in **6**. Again, we used the DSPPGM command to see that ILEAGCALLR was created with a named activation group and program ILEAGCALLR was created to use the *CALLER activation group. We can conclude that, if these programs performed identical functions, the difference is due to the extra activation group creation.

11 The cumulative CPU for program ILEAGCALLR is low, indicating that there is no problem with this program. Contrast this figure of 3.0% of the job′s CPU with the 83.9% figure in **2** for program ILEAGNEW and 3.7% of the job′s CPU for program ILEAGNAMED in **7**.

12 Program ILEAGC is called from program ILEAGCALLR 100 times. Note that the delete activation group programs present after program ILEAGN in **5** are not present here. This indicates that program ILEAGC was created with an activation group attribute of either *CALLER or ″named″.

13 The call levels shown in this example do **not** represent the actual call levels in the job at run time. They represent the call levels reconstructed by PEX STATS from the collected data.

14 Following each ILE program/PEP entry, you see the ***Alias** function. *Alias call level is always one more than its ″partner″ ILE program/PEP entry call level number. Therefore, all programs/modules and MI Complex Instructions call levels after an *Alias entry are one higher than you expect.

The correct relative call positions are as follows:

1. The PEP for program ILEAGNEW was at call level 1.
2. The PEP for program ILEAGN shows on the report as call level 3. However, since there was Alias on an intermediate call level (call level 2, in this case), the PEP for program ILEAGN really was at call level 2.

 We recommend applying PTF MF14447 to V3R6. PTF MF14447 became available in January 1997 that eliminates the *Alias entry and the call level numbers for ILE programs are what you expect. See Section 4.5,

"PEX STATS HIER Example - Program at Multiple Levels" on page 83 for a hierarchical example with PTF MF14447 applied.

V3R7 included support equivalent to V3R6 MF14447.

CONCLUSIONS

1. Using activation group attribute of *CALLER on ILE programs gives the best performance. Beware, however, of running these programs in the default activation group, which may cause behavioral differences.
2. Use of activation group attribute of NAMED is the next best performance option, assuming that the NAMED activation group is not continually being deleted in the job by some other program issuing a RCLACTGRP ACTGRP(*ELIGIBLE), RCLACTGRP(NAMED), or incorrectly using ″end run unit″ support.
3. Using activation group attribute of *NEW for programs frequently invoked in a job causes worst possible performance (uses a lot of CPU just to support the create/delete of the activation groups.
4. PEX STATS direct CPU, while technically correct, can be misleading in an ILE application environment.
5. In order to see the correct flow for ILE programs and ILE service program procedures at minimal overhead, use the following values for the enable performance collection value on the modules:

 a. Use ENBPFRCOL(*PEP) for ILE programs.
 b. Use ENBPFRCOL(*ENTRYEXIT *ALLPRC) for ILE service programs.

 The previous options ensure that the STATS HIER report show entries and call stack number for ILE programs and ILE service program procedures. It does not cause individual call stack entries to appear for individual ILE program procedures.

9.4 Are Program Activations/Deactivations Causing High CPU Utilization?

In application environments where there may be a large number of calls to programs, an excessive rate of program activations and deactivations may degrade performance.

9.4.1 Purpose

If many programs are called during transaction processing and the programs are activated and deactivated excessively, high CPU utilization may result. Why do we care about this? Because program activation involves allocation and initialization of static storage and this can be expensive in terms of CPU and disk IO. In many cases of program activation/deactivation, files are opened and closed as well.

Therefore, we want to identify:

1. The system-wide rate per second of application program activations
2. Whether any application programs are being repetitively activated and deactivated within a job

Based on the results of the first step of program activation and deactivation analysis, we may perform step two of this analysis to determine whether application performance improvements can be achieved through:

1. Ensuring the program's activation group is not deleted in the job for an ILE program.
2. Changing the program to "merely return" instead of fully terminating in an OPM or ILE compatibility mode environment.

Recall that for OPM RPG, we used to be concerned about the number of times QRGXINIT (OPM RPG program that initializes static storage) was called by an RPG program. If called more than once by the program in a job, this indicated that the program was being fully terminated (for example, the RPG program set on indicator LR (Last Record)) rather than returning (the RPG RETRN operation code). When this call and full termination sequence is repeated many times in a job, it uses a lot of CPU (CPU that is better utilized executing the statements that do real work in the program).

Recall also that beginning with V3R1 ILE RPG, we had the QRNXINIT system routine that performed the initialization of program or service program static storage for ILE RPG and ILE RPG compatibility mode programs.

At V3R6, we still see QRGXINIT being called for OPM RPG programs, but we do not see any explicit static storage initialization routine being called for ILE RPG and ILE RPG compatibility mode programs. For this reason, we need to be concerned with program activations, as program activations are the ILE measure used to determine how much static storage allocate/initialize activity is being performed.

9.4.1.1 What is Program Activation and Program Deactivation?

Within a job, the **first time** an ILE program is called (through a dynamic call, such as an RPG CALL operation), the CALL processing involves:

- Location of the program in the library list
- Authority checking
- Create activation group for ILE program being called, if it does not already exist in the job

Once the preceding processing has completed, the program must be activated. This *activation process* involves getting program resources (and associated service programs and their resources) ready to run as follows:

- Create program activation scoped to the specified activation group.
- Allocate static storage needed by the program.

 This storage is scoped to the activation group of the program.
- Initialize static storage needed by the program.
- Complete any binding to associated service programs, resolve linkages such that ILE bound procedure calls work successfully.
- Activate associated service programs.
- Allocate static storage needed by the associated service programs.

 This storage is scoped to the activation group of the service program.
- Initialize static storage needed by the associated service programs.
- Create a call stack entry in the job for the program.
- Initialize dynamic storage.
- Invoke the ILE program's PEP.

Program deactivation is the process of returning program resources, such as static storage, to the system. There are two types of program deactivation that occur:

1. Explicit Deactivation:

 For OPM and ILE compatibility mode programs, a special ″deactivate program″ trace event (known as a *DEACTPG MI complex instruction) can be tracked. Hence, the term ″explicit″ as there is evidence that this has occurred through a trace record.

2. Implicit Deactivation:

 ILE programs are never explicitly deactivated, so no ″deactivate″ trace event occurs. These programs are only deactivated as part of activation group deletion, hence, they are implicitly deactivated when their activation group is deleted.

We need to review the difference in activation and deactivation of OPM and ILE compatibility mode programs compared with ILE programs.

- OPM and ILE Compatibility Mode Programs:

 This section relates to all OPM programs and all ILE programs created using the CRTBNDxxx command with keyword DFTACTGRP(*YES) to ensure that they behave the same as OPM programs (referred to as running in OPM compatibility mode). The DSPPGM command can be used to see whether an ILE program was created with ″OPM compatibility mode″; if the ″Activation Group Attribute″ shows ″*DFTACTGRP″, an ILE program was created with ″compatibility mode.″

 Within a job, the first time the program is called (through a dynamic call such as an RPG CALL operation), it is activated with its resources scoped to the default activation group.

 If the program is fully terminated (using RPG SETON LR, COBOL STOP RUN, or C EXIT), program resources such as static storage are returned to the system and the program is **deactivated** within the default activation group.

 If the program is ″returned from″ without being fully terminated (using RPG/400 RETRN, ILE RPG RETURN, COBOL EXIT PROCEDURE), the program is no longer on the call stack but it still has its resources allocated (such as static storage) and is, therefore, still **activated** within the default activation group within the job.

- ILE Programs:

 This section relates to all ILE programs that were created with either CRTBNDxxx DFTACTGRP(*NO) or the CRTPGM command. These programs are normally run outside the default activation group. In fact, they can only be run in the default activation group as a result of their being created with activation group *CALLER and subsequently being called by a program running in the default activation group, such as QCMD.

 The DSPPGM command can be used to see the activation group attribute of an ILE program; the ″Activation Group Attribute″ does **not** show the value *DFTACTGRP.

 Within a job, the first time the program is called (through a dynamic call such as an RPG CALL operation), it is activated with its resources scoped to the activation group specified at program creation. The activation group attribute of an ILE program can be one of the following attributes:

– ***CALLER**

 The program runs in the activation group of the program that called it.

– **NAMED**

 The program runs in the ″named″ activation group. If this ″named″ activation group does not already exist in the job, it must be created before the program can be activated.

– ***NEW**

 A new activation group is built. The program is activated with its resources scoped to this activation group. When control is passed back from the program, both the program and the activation group disappear from the job.

Unlike OPM, if the ILE program is RPG and uses SETON LR, it is **not** deactivated as a result of the SETON LR and its resources are **not** returned to the system (static storage gets flagged for re-initialization, but the program stays activated). If the program is running in a *NEW activation group, it is automatically deactivated when it passes control back to a program/procedure in a different activation group. This deactivation occurs as a result of the *NEW activation group being automatically deleted.

To further emphasize this point, even if you have an ILE RPG program (built to run in a *NEW activation group) that uses RETURN to pass control back to its caller, the *NEW activation group is deleted and the program is implicitly deactivated.

ILE programs that have been activated within an activation group other than new (for example, caller or named) can only be deactivated through the deletion of the activation group in which they are activated. This can occur by one of two methods:

1. Using the Reclaim Activation Group command (RCLACTGRP).
2. A bound call being issued to an ″end run unit″ API.

Irrespective of how control is passed back from an ILE program (that does not use a *NEW activation group), the program remains activated in the activation group in the job (its static storage remains allocated).

At any point in time, a program or service program can be active once only within an activation group within a job. It can be activated multiple times within an activation group within a job **only if** each activation is followed by a deactivation (which is explicit for OPM and implicit for ILE). A program or service program can be activated within **different** activation groups within the same job. Only one copy of the executable program code held in main storage as it is the program variable resources (such as static storage variables) that are kept at the activation group level.

9.4.2 What Data to Collect

Please refer to Section 6.4.3, “Collecting Enhanced PEX TRACE Data” on page 133 for the types of data to collect using the SMTBCH command that enable program activation/deactivation analysis using the DEACTS reporting command.

Once the rate of program deactivations has been determined, Enhanced PEX TRACE is the easiest tool to use to identify the program names that are continually being deactivated.

9.4.3 How to Produce the Reports

Use Enhanced PEX TRACE to collect the data; this enables you to determine the rate of program deactivations per second and identify which programs are being repetitively deactivated by job.

1. Use Option 2 on the PEXTRC01 menu to Start Enhanced PEX TRACE using the following values for the SMTBCH command keywords:

   ```
   PROBLEM(*DEACTS) DURATION(10) PRTPEX(*YES) MIBRACKET(*NONE)
   ```

 Note that MIBRACKET(*ENTRYEXIT) is not necessary to obtain the application program names performing activation group creations, the definition created by the SMTBCH command always includes event data that has program names for a collection of type *DEACTS.

2. Use Option 9 on the PEX Reports Menu, PEXTRC02, for Program Activations and Deactivations. This runs the DEACTS command.

3. Use Option 8 on the PEXTRC01 menu to Display the PEX Trace run time. Write down the number of seconds during which the trace was active.

9.4.3.1 Frequency of Data Collection

Consider at least three collections of Enhanced PEX TRACE data to ensure that the results you are seeing are typical of ″normal″ system performance and not just the result of a ″one-of-a-kind″ operational environment. Avoid collecting data at start of day, shift change, or end of day working times.

Compare the results from the separate TRACEs to ensure that there is consistency among the application program names being most frequently activated and deactivated.

9.4.4 Program Activation/Deactivation Example

All of the following reports were produced using the DEACTS command on the PEXTRC02 Reports Menu. See Section 6.6.9, “DEACTS Reporting Command” on page 163 for more information on the DEACTS command parameters.

Either *DEACTS or *ACTGRP must be specified as the value against the PROBLEM keyword on the SMTBCH data collection command.

We need to determine whether we have a problem with:

1. The rate of program activation/deactivation system-wide.
2. The rate of program activation/deactivation within individual jobs.

On a 530 #2153 (4 way system) running an ILE application, consider a rate higher than 60 non-system program activations per second to indicate room for improvement, given that the system is operating in a steady state.

On a 530 #2153 (4 way system) running an OPM application, consider a rate higher than 60 non-system program deactivations per second to indicate room for improvement, given that the system is operating in a steady state.

The term ″steady state″ as used previously means that these measurements should be taken after the users have signed on and not during start of day or during shift change.

9.4.4.1 Finding the System Rate of Program Activation/Deactivation Example

```
08/09/96  13:22:25  Total Non-System Program Activations/Deactivations by Program      PAGE    1
                    (application program names starting with 'Q' will not be counted)
Non-system  Non-system        Non-system          Pct
Program     Program Activate  Program Deactivate  Systemwide
            Count             Count               Activations
ILEP2     4             203                   0        74.09
ILEAGN    4              23                   0         8.39
ILEP3     3              13                  13         4.74
RUNITO1   4               9                   0         3.28
OPMPO1    3               8                   8         2.92
ILEAGNEW  4               3                   0         1.09
RUNITO2   4               3                   0         1.09
OPMPO2    4               2                   0          .73
ILEP1                     1                   0          .36
        FINAL TOTALS
        TOTAL           265 2                21 1
```

Figure 62. Total Program Activations/Deactivations by Non-system Program Example

Note the following:

Ensure that you are using the correct report entitled *Total Non-System Program Activations/Deactivations by Program*.

This report is used to determine whether the overall system rate program activation/deactivation shows room for improvement. It should not be used to draw conclusions about specific programs.

1 If you are running OPM or ILE compatibility mode applications, use this figure to determine your system-wide rate of program activation/deactivation.

2 If you are running ILE applications (that are not compatibility mode), use this figure **instead** of **1** to determine your system-wide rate of program (implicit) deactivations.

3 These programs may be candidates for change. They are either OPM or ILE compatibility mode and are always being left through a full program termination (for example, SETON LR in RPG) rather than returning (for example, RETRN in OPM RPG).

If, however, program ILEP3 is activated/deactivated once in each of 13 jobs, there is no room for improvement through leaving the program in a returned state. We need to investigate further using the *job within program* report.

4 The number of explicit deactivations for these programs is zero and there were >1 activations. Therefore, this can be a case of one of the following:

- OPM issuing a return (and not a full terminate)
- ILE compatibility mode issuing a return (and not a full terminate)

- Full ILE programs either running in different activation groups in the same job or being implicitly deactivated and subsequently reactivated within the same activation group. The activation group attribute on the program is helpful in this analysis. We need to investigate further, using the *job within program* report.

Follow these steps to find the rate of program activations/deactivations per second:

1. Determine the active trace time using Option 8, Display Enhanced PEX TRACE Run Time for a Session, on the PEXTRC01 Enhanced PEX TRACE Main Menu.

 For this example, active Enhanced PEX TRACE run time was:

   ```
   Run time for trace session DEACTEX in library DHPEX is 000000107 seconds.
   ```

2. Given that above 90 activations/deactivations per second indicates room for improvement on a 530 #2153 and that these examples were run on a 510 #2144, using the CPW ratio of 85/299, we use 26 activations/deactivations per second as a guideline for the 510-2144.

 We know that some full function ILE programs were running in this example, so we use the total activations figure to compare to a rate of 26 activations per second.

 For this example, the rate of activations is:

   ```
   265 total activations / 107 seconds = 2.5 per second
   ```

3. Comparing 2.5 activations/second to 26 activations/second indicates that there is no problem with the overall amount of program activate/deactivate activity.

Next, we must check individual jobs to see whether there is any high activate/deactivate activity.

9.4.4.2 Checking the Job rate of Program Activation/Deactivation Example

We can use either of the two reports shown in this section to check for ″out of line″ activity within a job.

The following report is shown first because there are few jobs on this system. We also use this report to check the activation/deactivation rate of individual programs within jobs.

```
08/09/96  13:22:14         Program Activate/Deactivate in Job/Pgm Sequence          PAGE    1
Job                        Program         Program     Program    Pct Pgm Activates Total
                                           Activate    Deactivate of Job Activates  Activates
                                           Count       Count                        for Job
BATCHSTUFFA960123A  053978 ILEP2                201           0       100.00             201
                               TOTAL           201  1        0
P23XWY32E A960123A  053983 ILEAGN               10  2        0        35.71              28
                           ILEP3                6  3        6        21.43              28
                           OPMPO1               3  4        3        10.71              28
                           RUNITO1              3  5        0        10.71              28
                           ILEAGNEW             1           0         3.57              28
                           ILEP2                1           0         3.57              28
                           OPMPO2               1           0         3.57              28
                           QRGXINIT             1           0         3.57              28
                           QYPEENDP             1           0         3.57              28
                           RUNITO2              1           0         3.57              28
                               TOTAL           28           9
P23XWY32G A960123A  053980 ILEP3                7  3        7        30.43              23
                           OPMPO1               5  4        5        21.74              23
                           ILEAGN               4  2        0        17.39              23
                           RUNITO1              2  5        0         8.70              23
                           ILEAGNEW             1           0         4.35              23
                           ILEP2                1           0         4.35              23
                           QLEDAGE              1           0         4.35              23
                           QRGXINIT             1           0         4.35              23
                           RUNITO2              1           0         4.35              23
                               TOTAL           23          12
P23XWY32H A960123A  053979 ILEAGN               9  2        0        47.37              19
                           RUNITO1              4  5        0        21.05              19
                           ILEAGNEW             1           0         5.26              19
                           ILEP1                1           0         5.26              19
                           OPMPO2               1           0         5.26              19
                           QLEDAGE              1           0         5.26              19
                           QRGXINIT             1           0         5.26              19
                                                M05

08/09/96  13:22:14         Program Activate/Deactivate in Job/Pgm Sequence          PAGE    2
Job                        Program         Program     Program    Pct Pgm Activates Total
                                           Activate    Deactivate of Job Activates  Activates
                                           Count       Count                        for Job
P23XWY32H A960123A  053979 RUNITO2              1           0         5.26              19
                               TOTAL           19           0
JUNK      QSPLJOB   053464 QTMPLPRC             3           0       100.00               3
                               TOTAL            3           0
                               FINAL TOTALS
                               TOTAL          274          21
```

Figure 63. Program Activations/Deactivations in Job/Pgm Sequence Example

Note the following:

1 This job is performing the most activations at a rate of almost two per second; it certainly merits further investigation. Since only program ILEP2 is being repetitively activated in the job, we used DSPPGM to find that the activation group attribute was NAMED. This means that a program in this job is regularly deleting program ILEP2′s activation group through either the RCLACTGRP command or issuing an ″end run unit″. We have to refer to the PEX DETAIL report for this job to see what is happening. Please refer to Figure 65 on page 226 for further discussion.

2 We used DSPPGM on program ILEAGN and found that it is an ILE program created with activation group attribute *NEW. Since it is called multiple times within single jobs the activation group attribute is not appropriate. Re-create the program with an activation group attribute of *CALLER or NAMED and test to ensure it functions correctly.

3 This program is clearly being fully terminated each time it is called. We used DSPPGM to see that it is an ILE RPG compatibility mode program (the activation group attribute was *DFTACTGRP); we reviewed the source and verified that it uses RPG SETON LR. Since it is called multiple times within single jobs, it should be changed to use RETURN.

4 This program is clearly being fully terminated each time it is called. We used DSPPGM to see that it is an OPM RPG program; we reviewed the source and verified that it uses RPG SETON LR. Since it is called multiple times within single jobs, it should be changed to use RETRN.

5 We used DSPPGM to find that the activation group attribute was named (TESTAG). This means that a program in this job is regularly deleting activation group TESTAG through either the RCLACTGRP command or issuing an ″end run unit″. We have to refer to the PEX DETAIL report for this job to see what is happening. Please refer to Figure 66 on page 229 for further discussion.

On a system with many jobs, consider using the following report first as the programs requiring the most immediate attention tend to be at the top of the report.

```
08/09/96  13:22:23       Program Activate/Deactivate in Pgm/Job Sequence        PAGE    1
Program     Job                            Activates    Deactivates  Pct Pgm/Job
                                           for          for          Activates
                                           Pgm/Job      Pgm/Job      of All Pgm Activates
  1
ILEP2       BATCHSTUFFA960123A  053978           201            0          99.01
            P23XWY32G A960123A  053980             1            0            .49
            P23XWY32E A960123A  053983             1            0            .49
                                TOTAL            203            0
  2
ILEAGN      P23XWY32E A960123A  053983            10            0          43.48
            P23XWY32H A960123A  053979             9            0          39.13
            P23XWY32G A960123A  053980             4            0          17.39
                                TOTAL             23            0
  3
ILEP3       P23XWY32G A960123A  053980             7            7          53.85
            P23XWY32E A960123A  053983             6            6          46.15
                                TOTAL             13           13
  4
RUNIT01     P23XWY32H A960123A  053979             4            0          44.44
            P23XWY32E A960123A  053983             3            0          33.33
            P23XWY32G A960123A  053980             2            0          22.22
                                TOTAL             9            0
  3
OPMP01      P23XWY32G A960123A  053980             5            5          62.50
            P23XWY32E A960123A  053983             3            3          37.50
                                TOTAL             8            8
ILEAGNEW    P23XWY32G A960123A  053980             1            0          33.33
            P23XWY32E A960123A  053983             1            0          33.33
            P23XWY32H A960123A  053979             1            0          33.33
                                TOTAL             3            0
QRGXINIT    P23XWY32G A960123A  053980             1            0          33.33
            P23XWY32E A960123A  053983             1            0          33.33
                                                  M05


08/09/96  13:22:23       Program Activate/Deactivate in Pgm/Job Sequence        PAGE    2
Program     Job                            Activates    Deactivates  Pct Pgm/Job
                                           for          for          Activates
                                           Pgm/Job      Pgm/Job      of All Pgm Activates
QRGXINIT    P23XWY32H A960123A  053979             1            0          33.33
                                TOTAL              3            0
QTMPLPRC    JUNK      QSPLJOB   053464             3            0         100.00
                                TOTAL              3            0
RUNIT02     P23XWY32G A960123A  053980             1            0          33.33
            P23XWY32E A960123A  053983             1            0          33.33
            P23XWY32H A960123A  053979             1            0          33.33
                                TOTAL              3            0
OPMP02      P23XWY32E A960123A  053983             1            0          50.00
            P23XWY32H A960123A  053979             1            0          50.00
                                TOTAL              2            0
QLEDAGE     P23XWY32G A960123A  053980             1            0          50.00
            P23XWY32H A960123A  053979             1            0          50.00
                                TOTAL              2            0
ILEP1       P23XWY32H A960123A  053979             1            0         100.00
                                TOTAL              1            0
QYPEENDP    P23XWY32E A960123A  053983             1            0         100.00
                                TOTAL              1            0
                                FINAL TOTALS
                                TOTAL            274           21
```

Figure 64. Program Activations/Deactivations in Pgm/Job Descending Activate Sequence Example

Note the following:

1 A lot of activation group creates are occurring as a result of program ILEP2 being called in this job. The DSPPGM command showed that the activation group attribute of this program was NAMED. This means that a program in this job is either issuing the RCLACTGRP command or performing an ″end run unit″ causing the activation group for program ILEP2 to be deleted. We must refer to the Enhanced PEX TRACE detail report for this job to find out what is actually happening; please refer to Figure 65 on page 226 for the detail.

2 This program is responsible for more than one activation group creation in every job using it. We used the DSPPGM command and found

that it had an activation group attribute of *NEW (clearly, this should be changed to *CALLER or named).

3 This program is either OPM or ILE compatibility mode and is always being fully terminated. Note that the jobs using it are calling it more than once; therefore, it should be changed to use a soft return.

4 We used DSPPGM to find that the activation group attribute was NAMED. This means that a program in this job is regularly deleting this program's activation group through either the RCLACTGRP command or issuing an "end run unit". Refer to the PEX DETAIL report shown in Figure 66 on page 229 for further discussion.

We now review the PEX DETAIL reports for two jobs that are:

1. Responsible for most activation group creates system-wide.
2. Responsible for the most activation group creates for program RUNIT01, which was found to be activation group NAMED.

We need to review this level of detail in order to find out why program RUNIT01 and program ILEP2 are responsible for so many activation group creations on the system. Recall that the DSPPGM command shows that both these programs have an activation group attribute of NAMED.

9.4.4.3 PEX DETAIL TRACE Reports - Program Activation Example

We know that program RUNIT01 and program ILEP2 are either using the RCLACTGRP command or using the "end run unit" support to repeatedly delete activation groups in certain jobs. Recall that we verified that these programs do not have activation group *NEW. Since these programs are responsible for a large number of activation group creations, we need to identify why their activation groups are being deleted (clearly these two programs expect their activation groups to persist and not be continually deleted), which is why they were built using activation group NAMED.

Figure 65 on page 226 shows trace information for program ILEP2. Figure 66 on page 229 shows trace information for program RUNIT01.

Example

```
                                                Performance Explorer Report                                 8/09/96 13:19:52
                                                  Definition Information                                           Page    1
Library . . : DHPEX
Member. . . : DEACTEX
Description : DEACTS EXAMPLE
Type . . . . . . . . . . . . : TRACE
Definition Name. . . . . . . : DEACTS
Defined By . . . . . . . . . : A960123A
Definition Description . . . : DEACTS example
Trace Full Option. . . . . . : STOPTRC
Trace Size (KB). . . . . . . : 10240
Include Dependent Jobs . . . : YES
Sample Interval (ms) . . . . : 200
Selected Jobs:
    Name       User       Number
    *ALL       *ALL       *ALL
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *DEACTPG
    *DESAGP
Selected Events:
    Category  : BASE                -  Base Events
         *PMCO                PMCO   -  Performance Measurement Counter OverFlow
         *ACTGRPACTPRG        AGAPR  -  Activation Grp Act Program
         *ACTGRPCRT           AGCRT  -  Activation Group Create
         *ACTGRPDST           AGDST  -  Activation Group Destroy
    Category  : MIBKT Event          -  Machine Interface Program Bracketing Events
         *MISTART             MISTR  -  Machine Interface Instruction Start
         *MICPL               MICPL  -  Machine Interface Instruction Complete
         *EXIT                EXIT   -  Exit
         *ENT                 ENTRY  -  Entry
  (lines removed for the sake of brevity)
                                                Performance Explorer Report                                 8/09/96 13:19:52
                                                   Trace Information                                             Page   27
Library . . : DHPEX
Member. . . : DEACTEX
Description : DEACTS EXAMPLE
Time Stamp. : 13.17.07.1964 Task ID: 0000A2D8 Name: BATCHSTUFF A960123A   053978 Run Time (us):          5784336 Percent: 71.23
                  Address    Offset Object Name          Obj  Seg  PRE       NPgs LIC-Pgm--Offset MI-Pgm-----Offset NAGP PI AI
                                                         T ST T ST FIX            Unit Sector Span SKP XCH          EXID IEID
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-------------------------------------------------------------------------------------------------------------------------------
07.196 0   0000A2D8                  QWCDLYJB           0 2130826235    EXIT
07.196 0   0000A2D8                  QCLCLCPR        4727 2130830962    ENTRY
07.197 0   0000A2D8                  QCLCLCPR       37731 2130868693    EXIT
07.197 0   0000A2D8                  CALLILEP2       2649 2130871342    ENTRY  1
07.197 0   0000A2D8                  QCLRSLV         2850 2130874192    ENTRY
07.197 0   0000A2D8                  QLIADOPT       12384 2130886576    ENTRY
07.197 0   0000A2D8                  QLIADOPT        4529 2130891105    EXIT
07.197 0   0000A2D8                  QCLRSLV        22047 2130913152    EXIT
07.197 0   0000A2D8                  QCLCLCPR        2599 2130915751    ENTRY
07.198 0   0000A2D8                  QCLCLCPR       33615 2130949366    EXIT
07.198 0   0000A2D8                                  1853 2130951219    AGCRT  2
07.199 0   0000A2D8                                104541 2131055760    AGAPR  3         ILEP2
                                      4
07.213 0   0000A2D8                  ILEP2        1039063 2132094823    ENTRY   ILEP2/_QRNP_PEP_ILEP2
                                      5
07.213 0   0000A2D8                  ILEP2           7278 2132102101    EXIT    ILEP2/_QRNP_PEP_ILEP2
                                                  MO5


                                      6                                  A
07.213 0   0000A2D8                  QCLCLCPR        3816 2132105917    ENTRY
                                      6
07.213 0   0000A2D8                  QCLCLCPR       39826 2132145743    EXIT
                                      6
07.213 0   0000A2D8                  ILEP2           3058 2132148801    ENTRY   ILEP2/_QRNP_PEP_ILEP2
                                      6
07.214 0   0000A2D8                  ILEP2           2920 2132151721    EXIT    ILEP2/_QRNP_PEP_ILEP2
```

Figure 65 (Part 1 of 2). Program Activations/Deactivations Detail TRACE - Job BATCHSTUFF A960123A 053978

```
Library . . . : DHPEX
Member. . . . : DEACTEX
Description : DEACTS EXAMPLE
Time Stamp. : 13.17.07.2182 Task ID: 0000A2D8 Name: BATCHSTUFF A960123A   053978 Run Time (us):          5784336 Percent: 71.23
                  Address    Offset Object Name          Obj  Seg  PRE       NPgs LIC-Pgm--Offset MI-Pgm-----Offset NAGP PI AI
                                                         T ST T ST FIX            Unit Sector Span SKP XCH          EXID IEID
                                                    M05

ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-------------------------------------------------------------------------------------------------------------------------------
 (lines removed for brevity)
                                                 7
07.218 0   0000A2D8                    QCLCLCPR        2675 2132457283    ENTRY
                                                 7
07.218 0   0000A2D8                    QCLCLCPR       29556 2132486839    EXIT
                                                 7
07.218 0   0000A2D8                    ILEP2           2666 2132489505    ENTRY   ILEP2/_QRNP_PEP_ILEP2
                                                 7
07.218 0   0000A2D8                    ILEP2           2893 2132492398    EXIT    ILEP2/_QRNP_PEP_ILEP2
07.218 0   0000A2D8                    QCLRTNE         3093 2132495491    ENTRY
07.219 0   0000A2D8                    QCLRTNE         1861 2132497352    EXIT
07.219 0   0000A2D8                    QCLCLNUP        2292 2132499644    ENTRY
07.219 0   0000A2D8                    QCLCLNUP       17497 2132517141    EXIT
07.219 0   0000A2D8                    CALLILEP2        836 2132517977    EXIT  8
07.219 0   0000A2D8                    QCADRV          4898 2132522875    ENTRY
07.219 0   0000A2D8                    QCARULE        10277 2132533152    ENTRY
07.219 0   0000A2D8                    QCARULE        16705 2132549857    EXIT
07.219 0   0000A2D8                    QCAPOS          3348 2132553205    ENTRY
07.219 0   0000A2D8                    QCAPOS          8104 2132561309    EXIT
07.219 0   0000A2D8                    QCAFLD          2948 2132564257    ENTRY
07.220 0   0000A2D8                    QCAFLD          7730 2132571987    EXIT
07.220 0   0000A2D8                    QCADRV          1565 2132573552    EXIT
07.220 0   0000A2D8                    QCATRS          2883 2132576435    ENTRY
07.220 0   0000A2D8                    QCATRS          5753 2132582188    EXIT
07.220 0   0000A2D8                    QWVCCDLA        2281 2132584469    ENTRY
                          9                9
07.220 0   0000A2D8 QWVCCDLA  900006B *DESAGP          7805 2132592274    MISTR
07.220 0   0000A2D8 QWVCCDLA   00006C *DESAGP          1923 2132594197    MICPL
07.220 0   0000A2D8                    QWVPDAGE       15359 2132609556    ENTRY
07.220 0   0000A2D8                    QDMRCLSE        1768 2132611324    ENTRY
07.220 0   0000A2D8                    QUIRCLAP        2827 2132614151    ENTRY
07.220 0   0000A2D8                    QUIRCLAP         933 2132615084    EXIT
07.220 0   0000A2D8                    QOLCLNUP        1849 2132616933    ENTRY
07.220 0   0000A2D8                    QOLCLNUP        1867 2132618800    EXIT
07.220 0   0000A2D8                    QSQENDAG        2606 2132621406    ENTRY
07.221 0   0000A2D8                    QSQENDAG       65698 2132687104    EXIT
07.221 0   0000A2D8                    QCNSMCTL        4892 2132691996    ENTRY
07.221 0   0000A2D8                    QCNSMCTL        1343 2132693339    EXIT
07.221 0   0000A2D8                    QDMRCLSE        1883 2132695222    EXIT
07.221 0   0000A2D8                    QWVPDAGE         648 2132695870    EXIT
                                               10
07.222 0   0000A2D8 QLEDAGE    000003 *DESAGP          4217 2132700087    MISTR
07.222 0   0000A2D8                                    998 2132701085    AGDST  11
07.225 0   0000A2D8 QLEDAGE    000004 *DESAGP       254461 2132955546    MICPL
                                                    M05


07.225 0   0000A2D8                    QMHSNDPM        6763 2132962309    ENTRY
07.225 0   0000A2D8                    QMHSNDPM       27885 2132990194    EXIT
07.225 0   0000A2D8                    QMHSNDPM        2215 2132992409    ENTRY
07.226 0   0000A2D8                    QMHSNDPM       18401 2133010810    EXIT
07.226 0   0000A2D8                    QWVCCDLA        2016 2133012826    EXIT
07.226 0   0000A2D8                    QCLCLCPR        4833 2133017659    ENTRY
07.226 0   0000A2D8                    QCLCLCPR       32048 2133049707    EXIT
```

Figure 65 (Part 2 of 2). Program Activations/Deactivations Detail TRACE - Job BATCHSTUFF A960123A 053978

Note the following:

1 This ENTRY event shows program CALLILEP2 being invoked.

2 This AGCRT event shows that an activation group was created. An activation group is a result of calling a program that requires it. The caller of the program causing the activation group to be created was CALLILEP2 in **1**.

3 An activate program follows an activation group creation; here we see the activate program event AGAPR. The program being activated is the one causing the activation group to be created. This is shown on the next line.

4 Program ILEP2 is the program being called; we know this because of the ENTRY event against program name ILEP2. Because this program immediately follows the activate program and create activation group events, we know that this program caused an activation group to be created. Note that the trace data cannot provide the name of the activation group; it is available on the DSPPGM command.

5 Control is now returning to the caller of ILEP2 since here we see an EXIT event against program ILEP2.

6 This sequence is repeated 10 times in total, indicating that program ILEP2 is called 11 times in total by its caller. Note that **A** denotes the second call that occurred to program ILEP2 and that this second call was **not** preceded by either an activate program (AGAPR event) or a create activation group (AGCRT event). This shows that program ILEP2 does not have the *NEW activation group attribute.

7 This is the last of the sequence of 11 calls to program ILEP2.

8 Program CALLILEP2 is returning control to its caller due to the EXIT event.

9 Here we see an activation group being deleted since the MI complex instruction *DESAGP. Note that program QWVCCDLA is causing this delete to occur; this is the command processing program for the RCLACTGRP command. Now we know that the caller of program CALLILEP2 is issuing the RCLACTGRP command, causing the activation group of program ILEP2 to be deleted.

If this activation group delete had occurred as a result of either a program with ACTGRP(*NEW) returning control or an ″end run unit″, system program QWVCCDLA is not present.

10 Note the long list of system programs that are called as part of activation group deletion shown between **9** and **10**.

11 Here we see the destroy activation group event AGDST, showing that the activation group has now been deleted.

```
Library . . . : DHPEX
Member. . . . : DEACTEX
Description : DEACTS EXAMPLE
Time Stamp. . : 13.18.32.0663 Task ID: 0000A2D9 Name: P23XWY32H  A960123A   053979 Run Time (us):          459448 Percent:  5.66
                   Address    Offset Object Name          Obj  Seg  PRE       NPgs LIC-Pgm--Offset MI-Pgm-----Offset NAGP PI AI
                                                          T ST T ST FIX           Unit Sector Span SKP XCH          EXID IEID
ss.mmm P M Task ID  Parent-Pgm HLL-No CurrentPgm  RC Delta Run Cycles    Event
-------------------------------------------------------------------------------------------------------------------------------
  (lines removed for brevity)
32.067 0   0000A2D9                                  1700 2134934532    AGCRT
32.069 0   0000A2D9                                101744 2135036276    AGAPR
                                                      1
32.081 0   0000A2D9                    RUNIT01       928623 2135964899    ENTRY   RUNIT01/_QRNP_PEP_RUNIT01
32.081 0   0000A2D9                                  35526 2136000425    AGCRT
32.083 0   0000A2D9                                  99629 2136100054    AGAPR                     RUNIT02
                                                      2
32.153 0   0000A2D9                    RUNIT02      1254411 2137354465    ENTRY   RUNIT02/_QRNP_PEP_RUNIT02
                                                      3
32.154 0   0000A2D9                    RUNIT02         6292 2137360757    EXIT    RUNIT02/_QRNP_PEP_RUNIT02
32.154 0   0000A2D9                    QMHSNDPM       24679 2137385436    ENTRY
32.155 0   0000A2D9                    QMHSNDPM       50402 2137435838    EXIT
32.155 0   0000A2D9                    QMHPDEH        34060 2137469898    ENTRY
32.155 0   0000A2D9                    QMHPDEH         8724 2137478622    EXIT
32.156 0   0000A2D9                    QWVPDAGE       63633 2137542255    ENTRY
32.156 0   0000A2D9                    QDMRCLSE        2139 2137544394    ENTRY
32.156 0   0000A2D9                    QUIRCLAP        3304 2137547698    ENTRY
32.156 0   0000A2D9                    QUIRCLAP        1991 2137549689    EXIT
32.156 0   0000A2D9                    QOLCLNUP        1804 2137551493    ENTRY
32.156 0   0000A2D9                    QOLCLNUP        2117 2137553610    EXIT
32.156 0   0000A2D9                    QSQENDAG        2786 2137556396    ENTRY
32.157 0   0000A2D9                    QSQENDAG       39462 2137595858    EXIT
32.157 0   0000A2D9                    QCNSMCTL        4078 2137599936    ENTRY
32.157 0   0000A2D9                    QCNSMCTL        1456 2137601392    EXIT
32.157 0   0000A2D9                    QDMRCLSE        1811 2137603203    EXIT
32.157 0   0000A2D9                    QWVPDAGE         600 2137603803    EXIT
                                                      4
32.157 0   0000A2D9 QLEDAGE    000003 *DESAGP          4151 2137607954    MISTR
                                                      4
32.157 0   0000A2D9 QLEDAGE    000004 *DESAGP          1126 2137609080    MICPL
                                                      5
32.157 0   0000A2D9                    RUNIT01         5517 2137614597    EXIT    RUNIT01/_QRNP_PEP_RUNIT01
32.157 0   0000A2D9                                  3535 2137618132    AGDST
```

Figure 66. Program Activations/Deactivations Detail TRACE - Job BATCHSTUFF A960123A 053978

Note the following:

1 This ENTRY event shows that program RUNIT01 is being called. Note that immediately preceding this entry, we see both an activate program ACPRG and a create activation group AGCRT event. This means that program RUNIT01 is created to run in an activation group that did not exist in the job (either *NEW or NAMED).

2 This ENTRY event shows that program RUNIT02 is being called. Note that immediately preceding this entry, we see both an activate program ACPRG and a create activation group AGCRT event. This means that program RUNIT02 is created to run in an activation group that did not exist in the job (either *NEW or NAMED). Note also that since RUNIT01 was the application program with an ENTRY event immediately preceding this event, that program RUNIT02 must have called program RUNIT02.

3 This EXIT event shows that control is now being passed out of program RUNIT02. Thus, following trace events are not running as a result of program RUNIT02 being called. Since we know that program RUNIT02 has been entered but not exited, we know that following events either show an exit from program RUNIT01 or events that are as a result of statements being executed by program RUNIT01.

4 Here we see an activation group being deleted. Note that this time, the RCLACTGRP command processing program, QWVCCDLA, is not present in the preceding trace events and is not present as the Parent Program running the MI complex instruction *DESAGP. This means that program RUNIT01 caused an activation group to be deleted, since we know from previous events that program RUNIT01 is the closest application program on the stack and program RUNIT02 is no longer on the stack.

Either program RUNIT01 has activation group *NEW attribute or it is issuing the RCLACTGRP command. We use the DSPPGM command to check the activation group attribute. In this example, it was TESTNAME. Thus, we know that program RUNIT01 is performing an ″end run unit″.

5 This EXIT event shows program RUNIT01 passing control back to its caller.

9.5 Interpreting Enhanced PEX TRACE IOS and FLTS Reports

In order to be able to fully utilize the IOS and FLTS reports, it is necessary to have a good understanding of how the system works. Please refer to Section 10.2, “Physical Disk I/Os (IOS Command)” on page 255 for examples of all reports that you can produce using the IOS command. Please refer to Section 10.4, “Page Fault Information (FLTS Command)” on page 363 for examples of all reports that you can produce using the FLTS command.

9.5.1 What are Physical Disk I/Os and What Causes Them?

We must first review how different types of physical disk I/Os can occur.

If you use the Enhanced PEX TRACE SMTBCH command to collect general performance (*PERF) or disk I/O (*BUSYDISK) trace data, you can produce reports showing detailed physical disk I/O. You can also use the PRTPEXRPT command to print a detail TRACE report, where the Definition Information section of this report shows what DASD event types were traced. An example of the DASD events that are collected using SMTBCH PROBLEM(*PERF) follows.

```
                                                Performance Explorer Report
                                                  Definition Information
Library . . : QYPINT
Member. . . : DFNEX01
Description : *BLANK
Type . . . . . . . . . . . . : TRACE
Definition Name. . . . . . . : DFNEX01
Defined By . . . . . . . . . : A960123A
Definition Description . . . : *BLANK
Trace Full Option. . . . . . : STOPTRC
Trace Size (KB). . . . . . . : 50000
Include Dependent Jobs . . . : YES
Sample Interval (ms) . . . . : 200
Selected Jobs:
    Name       User       Number
    *ALL       *ALL       *ALL
Selected Task Names:
    *ALL
Selected MI Complex Instructions:
    *REQIO
    *SNSEXCPD
    *DEQ
    *ENQ
    *WAITEVT
    *RETEVTD
    *SUSPR
    *TERMPR
    *INITPR
    *RESPR
    *SIGEVT
    *UNLOCKSL
    *LOCK
    *LOCKSL
    *UNLOCK
    *SETIEXIT
Selected Events:
   Category  : BASE                -  Base Events
         *PMCO               PMCO   -  Performance Measurement Counter OverFlow
         *FLSHRHDNBKPT       BRKPT  -  Flasher BreakPoint
         *ACTGRPACTPRG       AGAPR  -  Activation Grp Act Program
         *ACTGRPCRT          AGCRT  -  Activation Group Create
```

*Figure 67 (Part 1 of 2). PEX Physical IO Events Collected using SMTBCH PROBLEM(*BUSYDISK)*

```
    Category  : ASM                 -  Auxiliary Storage Management Events
         USER                 USR    -  User Defined
         CRTSEG               CRT *  -  Create Segment
         DSTRSEG              DST *  -  Destroy Segment
         EXDSEG               EXT *  -  Extend Segment
         FNDSEGSIZ            FSZ *  -  Find Segment Size
         TRUNCSEG             TRN *  -  Truncate Segment
    Category  : DASD  1          -  Direct Access Storage Device Events
         *READSTR             *RS    -  Read Start
                              *RSF   -  Read Start Due to a Page Fault
                              *RCF   -  Read Complete Due to a Page Fault
                              *WSP   -  Write Start of a Purgeable Page
                              *WCP   -  Write Complete of a Purgeable Page
                              *xx A  -  DASD Event due to an Asynchronous Reque
         *WRTSTR              *WS    -  Write Start
                                          Performance Explorer Report
                                            Definition Information
Library . . : QYPINT
Member. . . : DFNEXO1
Description : *BLANK
    Category  : PGFLT                 -  Page Fault Events
         *PGFLTSTR            PFS    -  Page Fault Start
    Category  : SAR                   -  Segment Address Register Events
         *CLR                 CLR S  -  Clear
         *CLRPIN              CLP S  -  Clear Pin
         *EXCHCLR             CXP S  -  Exchange Clear
         *READ                RD  S  -  Read
         *READASYNC           RD  A  -  Read Asynchronous
         *READPIN             RDP S  -  Read Pin
         *EXCHREAD            RXN S  -  Exchange Read
         *EXCHREADASYNC       RXN A  -  Exchange Read Asynchronous
         *WRT                 WRT S  -  Write
         *WRTASYNC            WRT A  -  Write Asynchronous
         *WRTASYNCMSGQ        WMQ A  -  Write Asynchronous Track Message Queue
         *WRTASYNCMSGQLAST    WML A  -  Write Asynchronous Track Message QueueL
         *WRTASYNCTASK        WTT A  -  Write Asynchronous Track Task
         *WRTASYNCWAIT        WTW A  -  Write Asynchronous Track Wait
         *WRTRMV              WRM    -  Write Remove
         *RMV                 RMV S  -  Remove
         *UNPIN               UNP S  -  Unpin
         *UNPINRMV            RMU S  -  Unpin Remove
         *UNPINWRT            WTU S  -  Unpin Write
         *WRTPGOUT            WPO S  -  Write For Page Out
    Category  : MIBKT Event           -  Machine Interface Program Bracketing Ev
         *EXIT                EXIT   -  Exit
         *ENT                 ENTRY  -  Entry
```

*Figure 67 (Part 2 of 2). PEX Physical IO Events Collected using SMTBCH PROBLEM(*BUSYDISK)*

Note the following:

1 These are the physical disk IO events that are collected using either SMTBCH...PROBLEM(*PERF) or SMTBCH...PROBLEM(*BUSYDISK).

An explanation of these mnemonics is provided in Table 16 on page 233.

The first report produced using the Enhanced PEX TRACE IOS command is shown in the following figure. This report is useful for determining:

- If your system is doing more physical reads or physical writes:

 This information is useful for large AS/400 customers considering using cross system journaling products.
- If your system is performing these I/Os synchronously or asynchronously.
- If performance improves by using write cache DASD, assuming you do not already have write cache drives.

Note that if mirroring is active on your system, only one and not both of the mirrored writes appear on this report.

```
Type of Dasd  I/O Count  Percent of all        Total pages   Average pages   Minimum pages   Maximum pages
I/O                      system I/Os           transferred   transferred     transferred     transferred
                94,651       100.00            151,175.00          1.60            1.00           31.00
   *RSF S       46,161        48.77             63,853.00          1.38            1.00            4.00
   *WSP S       26,301        27.79             56,960.00          2.17            1.00           31.00
   *RX  A       13,031        13.77             20,338.00          1.56            1.00            8.00
   *RS  S        6,036         6.38              6,747.00          1.12            1.00           12.00
   *RS  A        2,980         3.15              2,993.00          1.00            1.00            6.00
   *WS  S          111          .12                253.00          2.28            1.00           21.00
   *WS  A           18          .02                 18.00          1.00            1.00            1.00
   *WSP A           13          .01                 13.00          1.00            1.00            1.00
```

Figure 68. Systemwide Disk IOs by IO Type

The mnemonics in the preceding example (and others) are explained in Table 16. This I/O type table is duplicated in Section E.2, “Physical Disk I/O Types” on page 496 for ease of use when reviewing a PRTPEXRPT report in the customer environment.

Table 16. Physical Disk IO TRACE Mnemonics

Physical IO Type	Description
*RS S	Start of a synchronous explicit DASD read I/O initiated by an explicit SAR READ/BRING request (as opposed to an ***implicit*** DASD read due to a page fault).
*RS A	Same as *RS S except performed asynchronously.
*RX S	Similar to *RS S except the program (LIC, OS/400) issuing the SAR READ/BRING request has additionally provided the address of pages which are to be ***replaced*** with the newly read data. The ′X′ in the mnemonic stands for ***exchange*** and the full name is ***exchange read*** or ***exchange bring***.
*RX A	Same as *RX S except performed asynchronously.
*RC	Marks the completion of either an *RS S, *RS A, *RX S or *RX A.
*RSF S	Start of a synchronous implicit DASD read I/Os due to a page fault.
*RSF A	Start of a synchronous implicit DASD read I/Os due to a page fault which occurs during the servicing of some asynchronous I/O request (fairly rare).
*RCF	Marks the completion of an *RSF S or *RSF A.
*WS S	Start of a synchronous explicit DASD write I/O initiated by an explicit SAR WRITE/PURGE request. The pages written are not made ″easy steal candidates″.
*WS A	Same as *WS S except performed asynchronously.
*WC	Marks the completion of either a *WS S or *WS A.
*WSP S	Start of a synchronous explicit DASD write I/O initiated by an explicit SAR WRITE/PURGE request. The pages written are made ″easy steal candidates″ following the I/O.
*WSP A	Same as *WSP S except performed asynchronously.
*WCP	Marks the completion of either a *WSP S or *WSP A.
*PR	Start of a non-virtual READ-SECTOR type physical DASD read. This is redundant because it is followed by an *RS which denotes the ″real″ start of the I/O.
*PR C	Marks the completion of a *PR. This is redundant, it is preceded by an *RC.
*PW	Start of a non-virtual WRITE-SECTOR type physical DASD write. This is redundant because it is followed by a *WS which denotes the ″real″ start of the I/O.
*PW C	Marks the completion of a *PW. This too is redundant, it is preceded by a *WC.

Notes on these Physical I/O mnemonics:

Each of these represent a trace event record that MAY be seen in the Enhanced PEX TRACE detail report using PRTPEXRPT ..TYPE(*TRACE).

The ″S″ or ″A″ following the mnemonic indicate either Synchronous or Asynchronous. However, sometimes Synchronous operations omit the ″S″... a blank should be treated as an ″S″ = synchronous.

9.5.1.1 Physical Disk I/O Versus Logical I/O

All the physical I/Os mnemonics represent true, physical DASD operations. This may sound obvious, but it is important to understand the difference between ***logical*** DASD operations verses ***physical***.

An example: Suppose an RPG program is sequentially reading a data base file member, using the appropriate OVRBDBF...SEQONLY(*YES n) type of access. In such a case, the LIC layer of the operating system is performing ***explicit*** ″read aheads″ through issuing **SAR READ** logical DASD requests. Each **SAR READ** may result in 0-to-N physical DASD reads. A **SAR READ** results in physical DASD read (or reads) if the requested pages are valid and ***not already somewhere in mainstore***. LIC Storage Management (just as its parent, CISC/IMPI Storage Management did) avoids unnecessary DASD operations. In particular, it does not do a DASD read for a page already in mainstore (anywhere) and it does not do a DASD write for a page that has not been changed (modified) since it was read in from DASD.

A large percentage of write-type I/Os on ″healthy″ systems are performed asynchronously.

9.5.1.2 Virtual Pages Versus Sector I/O

Physical reads and writes to DASD can be divided into two categories:

- **Virtual Page** - the address field (columns 21-37 in a TRACE detail report (from PRTPEXRPT) are NOT set to ′0000000000 000000′).
- **Sector I/O** - the address field (columns 21-37 in a TRACE detail report ARE ′0000000000 000000′).

Virtual Page I/O is ″normal″ reads and writes of objects ″and jobs″ pages (for example, faulting on a page of program variable storage, reading pages of a physical file member, or writing pages of a library after creating an object into the library).

Sector I/O are DASD reads and writes **not** associated with virtual pages (that is, objects, jobs′ storage, and so on). Examples include:

- Reading/writing of objects during a SAVE/RESTORE command (yes, this is a contradiction of terms... but Save/Restore uses **READ SECTOR** for performance reasons).
- Reading/writing information about the state of mirror DASD stripes.
- Reading capacity/status information on RAIDed drives.
- Writing what are known as ″extent headers″ during the creation, deletion, or size change of permanent segments (objects). A high rate of ″extent header″ writes can indicate a high rate of CRTxxx/DLTxx activity.

The main differences that might be noticed are: **Sector I/O** does **not** have an object/segment name, type, or subtype and they do **not** have a mainstore pool ID (both of which **are** present for **Virtual Page** I/Os).

Even though Sector I/O does not have an object name associated with it, it can be a contributor to performance problems. Sector I/O can make DASD arms

busy (just the same as virtual I/O) and can take a relatively long time (15ms) to complete (just the same as virtual I/O). Therefore, depending on the number (or better yet, the percentage) of all I/Os that are Sector type I/Os, it may warrant further investigation.

9.5.1.3 Synchronous Versus Asynchronous DASD I/O

Physical DASD read and write I/Os can be performed either synchronously or asynchronously. Asynchronous I/Os are DASD reads and writes that are started by a job/task, but that are not (implicitly) waited upon for completion....control returns to the program requesting the I/O before the I/O is complete. This permits overlapping DASD operations with other (CPU) processing. Keep in mind, however, that asynchronous requests are not always as benign as they might first appear. Asynchronous I/Os:

- Consume CPU (just as synchronous I/Os do).
- Can make for busy DASD arm (or arms) (just as synchronous I/Os can).
- Can be ***waited for later***, thereby masking a synchronous activity in order to gain a little bit of overlapped I/O and CPU processing.

Writes: Most write-type I/Os are performed asynchronously (which, in general, are better performing than synchronous writes). Examples of common activities that can cause **synchronous writes** include:

- CRTxxx/DLTxxx activity, such as CRTPF (or ADDPFM) and DLTF (or RMVM).
- FRCRATIO(1) on physical files being written to.
- The pool-maintenance write-purges that take place in the storage management ***Page Out Tasks*** (tasks with names that begin **SMPO**).
- The PAG writes that occur when jobs enter long wait and have the **PURGE(*YES)** attribute ***and*** the LIC code has determined that a true PAG purge is necessary (this time).

Typical **asynchronous write** activities include:

- Writes to journal receivers.
- FRCRATIO(*NONE) physical files being written to.
- Writes against **library** objects during CRT/DLT activity into/from the libraries. This, by the way, is typically an async write that is ***waited upon for completion***, making it nearly as ″bad″ as a synchronous write.

Reads: There is less ″typical″ typing of read I/Os concerning their sync/async attribute (as opposed to write I/Os). **Page faults**, of course, are by nature synchronous. In general, if the OS/400 and LIC ″know″ that a set of pages ***is*** referenced in the near future (typically tens to hundreds of milliseconds), an explicit asynchronous read request facilitates overlapping the I/O delay with CPU processing. Examples of common activities that can cause **asynchronous reads** include:

- **OVRDBF SEQONLY(*YES nnnn)** data base reads
- Access path builds
- Query record selection ″scanning″
- ″Extra″ read-aheads performed in an Expert Cache (*CALC) pool

User Control over Synchronous/Asynchronous Attribute: Neither the application developer nor the system administrator has direct control over whether I/Os are performed synchronously or asynchronously. However, using the PEX Trace Tool described in this section, one can get clues to possible poorly performing applications/programs. For example, if a set of database files is incurring a massive number of synchronous writes, this is a possible indication of FRCRATIO(1).

9.5.1.4 Reads: Page Fault Reads Versus Explicit Reads

There are two methods of reading virtual pages into mainstore from DASD:

- Explicit SAR READ requests
- Page faults

Explicit SAR READ requests are logical DASD read requests coded into OS/400 and LIC/400 operating system code. A common example are the ″read-aheads″ issued by database while an application program is sequentially reading a physical file member. In general, whenever system code thinks a page fault might occur ***and it is beneficial to read in MORE pages than are normally read in due to the page fault***, the code issues some type of **SAR READ** to request as many pages as it thinks are appropriate to be read into mainstore. Also, explicit SAR READ can be requested to be performed asynchronously contrasting with page faults that are always synchronous in nature.

Page fault DASD reads occur whenever a legitimate virtual address is touched that is not resident in mainstore. The program that incurred the fault stops while the faulted-on page (or pages) are synchronously read into mainstore.

Page faults require additional explanation. There can be (and usually is) a **big** difference in the number of ***logical page faults*** and ***page fault DASD reads***. First, what is meant by ***logical page faults***? Answer: the low level action that occurs when a virtual page is ″touched″ and that page is not ″ready, willing and able″ in mainstore. This action can occur but is ***not*** followed by a DASD read. The following table illustrates the common page fault conditions and the resulting actions.

- The touched page is a valid virtual page that is not in mainstore (in any state).
 - **Resulting action:** A physical DASD read (*RSF)
- The touched page is a valid virtual page that **is** in mainstore, but a physical DASD **write** is currently in progress.
 - **Resulting action:** LIC ″clones″ the current content of the virtual page into another location in mainstore and the faulting program is resumed ***without*** starting or waiting for any DASD operation (or operations).
- The touched page is a valid virtual page that is not in mainstore, but a physical DASD **read** is currently in progress that eminently makes it available in mainstore.
 - **Resulting action:** The faulting program simply waits for the previously started DASD read to complete.

 Note: This read may have been asynchronously started by the faulting job/task, or started (synchronous or asynchronous) by some other job/task.

- The touched page is **not** a valid virtual page (that is, a ″bad″ address is touched).
 - **Resulting action:** An exception is presented to the faulting program (no DASD I/O is started or waited upon).

9.5.1.5 Writes: Easy Steal (Purge) Versus Non-Easy Steal (Write)

First, keep in mind that a DASD write of a virtual page (see earlier) **never**, in and of itself, causes the written page (or pages) to be removed from mainstore. DASD writes, however, can cause page (or pages) to become ***easy steal candidates***. This type of DASD write is usually referred to as either:

- **Easy steal**, - or -
- **Purge**

So, DASD writes that are of the purge/easy-steal nature differ from ″normal″ DASD write only in that the former also makes the mainstore pages (after the write I/O) easy-steal candidates.

This is of significance if pages are **PURGED** (instead of **WRITTEN**) and soon thereafter (milliseconds) faulted on.

9.5.2 The ″Cost″ of DASD I/Os

Each DASD I/O requires a small amount of CPU resource and DASD IOP, controller, and disk arm resource. When there are a large number of physical DASD I/Os during a ″transaction,″ performance degradation may occur. This topic discusses the ″cost″ of a DASD I/O from different viewpoints.

9.5.2.1 All DASD I/Os

All DASD I/Os (sync/async, reads/writes/faults):

- Consume **some** main CPU to initiate and complete.
- Incur at least one task switch or processor interrupt, both of which disrupt processor instruction/data caching optimizations.
- Represent traffic on a system bus.
- Compete (and queue) with other DASD requests to the same DASD subsystem/arm.
- Imply that the LIC Storage Management component must obtain system-wide serialization semaphores for at least ***some*** time (typically microseconds, but can be longer) to manage the mapping of DASD sectors to mainstore page frames. These semaphores imply possible additional contention/queueing.

9.5.2.2 All Synchronous DASD I/Os

All **synchronous** physical disk I/Os imply waiting for a response from the DASD subsystem indicating that the I/O has completed (hopefully successfully!). Modern non-cached DASD subsystems, if not over-utilized, take (order of) 10 milliseconds per operation. Cached DASD subsystems take (order of) one millisecond per operation. One or 10 milliseconds may not sound ″significant″, but represent (in general) a large component of response time in AS/400 applications. Minimizing synchronous disk I/Os is something that should be strived for. This is (somewhat) less true if the DASD subsystem is ***cached***.

9.5.2.3 Read I/Os

Both synchronous and asynchronous DASD read I/Os incur a higher cost of CPU and Storage Management Semaphore Queueing (see previous section) than do DASD write I/Os. Why? Storage Management has to ″find″ a home (in some mainstore pool) for the inbound page images. This is **less** true if the read I/O was an ***exchange read*** (***RX** PRTPEXRPT mnemonic). This type of I/O means that the LIC coding issuing the read has provided (in addition to the addresses of the pages it wants read into mainstore) the address of pages ***it wants replaced, if possible***, by the inbound pages. This reduces the CPU/Semaphore processing time normally used to locate ″stealable pages″.

9.5.2.4 Asynchronous Read I/Os

An asynchronous read I/O does **not** guarantee that some job or task will not wait for the DASD operation to complete. If the virtual address is touched prior to completion, a page fault occurs and the touching code waits for the previously started asynchronous read to complete.

9.5.2.5 Asynchronous Write I/Os

An asynchronous write I/O does **not** guaranty that some job or task will not wait for the DASD operation to complete. OS/400 and LIC code can, at their discretion, ***wait for outstanding write I/Os to complete***.

9.5.3 ″Bad″ DASD I/Os

This discussion is based on experiences of examining SMTRACE runs from CISC (IMPI) machines and PEX trace runs from RISC machines. Included are examples of object names/types and I/O types that ***have***, at least once, been an indication of a less-than-optimal application (or system!) design. **It does not represent hard and fast rules, and should not be used to incriminate any software without additional investigation.** It is but one of many **starting points** along the path of possible performance improvements.

The sub-topics that follow focus on a high ***rate*** of I/Os. It is important to keep the ***rate*** in mind, particularly because the current set of PEX queries do **not** report rates, just counts. So, the question might be asked: ″What is a high rate for such-and-such?″ That is, of course, an extremely difficult question to answer since it is contains many ″...it depends on...″ conditions. As a general rule, however, on a ″normal″ application system, one wants or expects the top object ***types*** that are incurring I/Os to be physical and logical file members (object types 0B90 and 0C90 respectively). On systems with ″lots″ of jobs active, another normal object type to incur lots of I/Os is a ″Process Control Space″ (object type 1AEF), which is used to keep track of the work being done by a job.

Refer to Table 16 on page 233 for a summary of the I/O type acronym definitions used in the following sub-topics.

9.5.3.1 Writes (*WS, *WSP) Against QTEMP Objects

This is a possible indication of many CRTxxx/DLTxxx object commands being issued, probably within CL programs, inserting and deleting objects from QTEMP libraries. On all systems at a QSECURITY level of **less** than 50, QTEMP libraries are really permanent objects that, therefore, incur physical disk writes when objects are created-into or deleted-from. In addition to the writes against QTEMP, there are usually writes against the objects (possibly ***many*** more than the number against QTEMP) that are being created and deleted into or from QTEMP. However, these are much harder to ***see*** in the PEX queries because

most of these I/Os are grouped under the object name ***DESTROYED**, which makes it more difficult to ascertain this activity. So QTEMP activity can highlight a ***bigger*** problem than just the disk writes against QTEMP.

Additionally, libraries with a relatively small number of objects in them (such as QTEMP) tend themselves to be relatively small so the pages that are written during the CRT/DLT activity tend to be the same small set of pages, which can lead to busy disk arm (or arms).

9.5.3.2 Writes (*WS, *WSP) Against Library Objects (Object Type 0401)

These types of writes exhibit the same object usage and disk I/O attributes as discussed for library QTEMP in Section 9.5.3.1, “Writes (*WS, *WSP) Against QTEMP Objects” on page 238.

9.5.3.3 Writes (*WS, *WSP) Against User Profiles (Object Type 0801)

This can also be similar to the I/Os to QTEMP and other libraries as previously described. Writes to user profiles occur when:

- An object is created to be owned by the profile.
- An object owned by the profile is deleted.
- Private authorities are changed to an object.

Therefore, user profile writes are also an indicator that ″excessive″ CRTxxx/DLTxxx activity is present.

9.5.3.4 Writes (*WS, *WSP) Against Data Areas (Object Type 190A)

This can be an indication of frequent **CHGDTAARA** commands. The following has been observed more than once: Some application performing many CHGDTAARA commands against the same data area (or areas) but always (or nearly so) setting the ***same*** value into the data area (or areas). Neither data area management nor Storage Management ″know″ that the data area ″already contains this value″ so this is treated the same as a CHGDTAARA that ***does*** change the value (that is, induces several page writes per command). If this occurs frequently against one or two data areas, it can lead to busy disk arm (or arms) (data areas are small, and the ***same*** small set of pages is written over and over again).

9.5.3.5 Synchronous Writes (*WS S, *WSP S) Against Database Objects

Synchronous writes against physical file members (object type 0B90) may indicate the presence of a non-zero value for a file′s **FRCRATIO** (records to force a write) parameter. Synchronous writes against access paths members (object type 0C90) may indicate the presence of a non-zero **FRCACCPTH** parameter value.

Note: This is a good example of why additional investigation is ***required***. Synchronous writes against these objects are not ***necessarily*** caused solely by the previously mentioned attributes.

9.5.3.6 Sizes of Read and Write I/Os Against Database Objects

Keeping in mind that a page size is 4096 bytes on a RISC machine, the I/O ***average number of pages transferred*** value can give an indication if blocking has been properly utilized. This probably requires additional investigation:

- Are the files being randomly accessed (QDBGETKY is involved)? Random access is less likely to use blocked record I/O (that is, it is more likely to see QDBGETSQ rather than QDBGETM). ***However, it is possible to use blocked record I/O even if reading a file through an access path***.
- Are the files open for input only or output only? This can be (mostly) determined by the presence or lack-of PUT type modules (QDBPUT, QDBPUTM) for the same file being read (or the update/delete module QDBUDR) or for GET type modules (QDBGETSQ, QDBGETM) for the same file being written.
- Are the virtual addresses of the physical file data space segments (object type 0B90, segment type 0003) perfectly marching forward? If so, the file is truly being accessed in arrival sequence and the best OS/400 module to do this efficiently is QDBGETM. The presence of QDBGETSQ instead of QDBGETM indicates the open is lacking OVRDBF SEQONLY(*YES ...), or that it might be open for input and output.

9.5.3.7 Reads (*RS, *RSF) Against QWCBTxx Objects

A high rate of I/Os to a Work Control Block Table (WCBT) is an indication that the internal OS/400 control block (or blocks) that keeps track of all ***jobs in the system*** is ″large″ (and that it is being accessed frequently). This control block, under normal circumstances, is as large as the ″high water mark″ of ***jobs in the system (JIS)*** (as displayed by WRKSYSSTS). For example, if JIS was 14 000 during an overnight batch run, but spooled files are cleared and the current JIS is 8000, the QWCBTxx control block is ***at least*** large enough to hold 14 000 jobs. Over time, the maximum ″job entries″ are reused by new jobs. If no one uses many of the available job entries, you have significant storage occupied on your system and functions that use the job entries can exhibit poor performance.

These functions include Work with Active Jobs (WRKACTJOB), Work with Subsystem Jobs (WRKSBSJOB), and Work with User Jobs (WRKUSRJOB).

You can assist the system in compressing out unneeded job entry space and returning to the number of entries specified in system value QTOTJOB by creating a data area and setting values in the data area.

The compression is made capable through a PTF for V3R1 and is included in base V3R2, V3R6, and V3R7. On V3R6 or V3R7, you can use the following commands to have the system compress the space **during the next IPL**:

1. Create a specific data area:

   ```
   CRTDTAATA    DTAARA(QSYS/QWCBTCMPTB) TYPE(*CHAR) LEN(1)
   ```

2. After creating the data area QWCBTCMPTB, set the data area value to 1 to have the WCBT entries compressed **on the next IPL**:

   ```
   CHGDTAARA  DTAARA(QSYS/QWCBTCMPTB) VALUE('1')
   ```

3. Turn the power off for the system and IPL.

 IPL time is dependent on how many WCB table entries there are to clean up, which is done by OS/400 job QWCBTCLNUP during IPL.

Some time later you may turn off WCBT compression during IPL by setting the data area to 0:

```
CHGDTAARA  DTAARA(QSYS/QWCBTCMPTB) VALUE('0')
```

Typically, you can use "1" for a while and set compression to not occur. You may determine to set system value QTOTJOB to a value smaller than before. If QTOTJOB has to be extended frequently during run time, overall system performance is degraded. You may want to increase the QTOTJOB value. See *AS/400 Work Management*, SC41-4306, for more details.

9.5.3.8 Reads (*RS, *RSF) Against Journal Receiver Objects

Read I/Os against journal receiver objects (object type 0701) usually indicate either or both of the following situations:

- Excessive Commit **ROLLBACK** activity.
- The presence of some application to keep database files synchronized across multiple systems.

9.5.3.9 Reads or Writes Against *DTAQ Objects

"Large" numbers of read type I/Os (*RS, *RSF) or write type I/Os (*WS, *WSP) against data queue objects (object type 0A01) might indicate excessively large data queue objects. Large data queue objects may imply a CPU burden during SNDDTAQ or RCVDTAQ operations. A general guideline is to keep the number of unprocessed data queue entries to 100 or less for best performance.

9.5.3.10 Reads Against SM xxx DIRECTORY "Objects"

A high rate of read I/Os (*RSF, most likely) against internal micro-code objects with the following names or types can indicate performance problems:

- SM PERMANENT DIRECTORY
- SM TEMPORARY DIRECTORY
- SM FREE SPACE BIT MAP

Problems can be in one or more of the following activities:

- A high rate of CRTxxx/DLTxxx activity
- A constricted machine pool
- A high rate of internal OS/400 or microcode objects/segment creates/deletes

9.5.3.11 Fault Reads (*RSF) against "MWS" Segments

The term **M**achine **W**ide **S**torage stands for an internal LIC heap used to manage small chunks of "run-time storage". Several LIC components use MWS, but communications is probably the "biggest" user. Lots of page fault reads against MWS (frequently in the machine pool) can indicate either or both:

- Some "runaway" communications application
- A high frequency of communication control unit or line protocol errors
- A broadcasting remote device such as is possible with IP networks
- A constrained machine pool

There are other LIC uses of MWS that can indicate problems, so similar to all items in this list, further investigation is probably required.

9.5.3.12 Fault Reads (*RSF) Against ″L/L″ or ″L/L Range X″

The term ″L/L″ stands for Link Loader. LIC programs are managed (loaded, PTFed, relocated) by the Link Loader, which is itself a LIC component. Paging (faulting) against the segments with names containing ″L/L″ simply means that LIC programs are paging. A certain amount of LIC paging is normal. Higher page rates on RISC versus CISC systems is ″normal.″ This is primarily due to the growth in instruction stream size on a RISC system as compared to CISC architecture.

However, excessive LIC paging is also a sign of a constrained memory pool.

Note: Some LIC code always pages in the machine pool. Other LIC code pages may be stored in the pool that the job or LIC task is running in.

9.6 Object Names and Types Appearing in TRACE Reports

This topic is provided to enable you to better interpret the Enhanced PEX Trace reports produced from the IOS, FLTS, OBJSIZE, and NETSIZE commands.

9.6.1 Selected System Object Names Appearing in TRACE Reports

This first topic describes some common ″items″ (segments, objects, and control blocks) that might appear in query output that contains **object names**.

Note: In the following descriptions, ″xxx″ might be ″blanks″ or one or more additional words.

SM PERM DIR SEGMENT, PERM DIR SID xxx
Internal micro-code **S**torage **M**anagement control block that keeps track of all permanent objects/segments by virtual address and disk address.

SM TEMPORARY DIR SEG, TEMP DIR SID xxx
Same as PERM, but for temporary segments/objects.

MACHINE CONTEXT
Internal micro-code control block that is essentially the root library. The addresses of all libraries, user profiles, device/controller/line descriptions are kept in here.

DATA BASE IN-USE TBL
Internal micro-code control block that keeps system wide information about each open physical and logical file member.

xxx ERR LOG SID, ERROR LOG xxx
Internal micro-code control block that holds information about problems/errors in the **Product Activity Log**.

xxx VLOG SID, VLOG xxx
Internal micro-code control block that holds information about problems/errors in the **Licensed Internal Code log**.

APPN xxx Information about APPN topology. High paging against this object might indicate an APPN topology ″storm″.

L/L xxx The segments that hold the LIC micro-code.

FREE SPACE xxx BIT MAP xxx
Internal micro-code control block that keeps track of all DASD ***free space***.

SEIZE LOCK xxx

Internal micro-code control block that keeps track of all LOCKs and SEIZEs active on a machine. High paging against this can indicate a large number of LOCKs and SEIZEs.

9.6.2 Object and Segment Types Appearing in TRACE Reports

Object is a term that has several meanings on an AS/400 system depending on who you are talking with. Many users consider a keyed physical file that contains a single member as one object. From a PEX trace point of view, however, that file and member is viewed as:

- A **FILE** space object (1901) comprised of a single segment
- A **FILE FORMAT** space object (1951) comprised of a single segment
- A **COMPOSITE PIECE - DATA SPACE** object (0B90):
 - Comprised of a base segment
 - At least one data segment
 - Probably an ″associated space″ segment
 - Maybe a field mapping segment
- A **COMPOSITE PIECE - DATA SPACE INDEX** object (0C90):
 - Comprised of a base segment
 - Maybe additional index segments
 - Probably an ″associated space″ segment

Each of the ***segments*** in the previous discussion have a unique five or six-byte ″SID address″ (the segment address portion of an eight-byte virtual address. It might be five or six, depending on whether the segment was a ″big″ or ″little″ segment).

This topic describes some common ***object types*** that might appear in query output that contains object types. There are many object types that print a description that is just as valuable as one that might be provided here (such as ″User Profile″); those **are not** included in the following list. This list contains (mostly) obscure type names for common objects. (As used in this redbook, the word ″obscure″ means rarely used and not well known).

Each item in the following list is preceded by the internal object type 4 hexadecimal characters number. These numbers correspond to the data found in column 60 to column 63 of a PRTPEXRPT.

1901: FILE

The anchor object of all database, display, communications or *SAVF files. For database, this is ***not*** a member; it is the anchor point for all (if any) members.

1390: DUMP SPACE

The part of an *SAVF that contains the actual (save/restore) data.

1951: FILE FORMAT

The part of a field level file that contains (remembers) the file′s field definitions/descriptions.

0D50: DATA BASE FILE MEMBER

The part of a database file member (physical or logical files) that ***anchors*** the member. It does not contain the data for a physical file member nor the access path for a logical file member (it does have

pointers to these other pieces). During a full file (member) OPEN, it is these objects that are duplicated (into 0DEF objects) and that are called the ODPs (Open Data Paths).

0DEF: DATA BASE OPERATIONAL CURSOR
An **OPEN** instance of a DATA BASE FILE MEMBER.

1952: OIR SPACE
The part of a library object that contains the text and other generic information common to all objects similar to last save date.

0B90: COMPOSITE PIECE - DATA SPACE
The part of a physical file member that actually contains the data (records).

0C90: COMPOSITE PIECE - DATA SPACE INDEX
The part of keyed physical file member or of a keyed logical file member that contains the access path. (It ***is*** the access path).

19E2: DISTRIBUTION TRACKING OBJECT
Part of SNADS inbound/outbound distributions.

0EC4: INTERACTIVE PROFILE
The object that remembers items on a per User Profile bases such as ″the last file used with WRKMBRPDM″ or ″the last library used with WRKQRY″.

18A0: JOB MESSAGE QUEUE
The object internal to all active jobs that holds the messages processed with SNDPGMMSG or RCVMSG commands and also the messages that are ultimately printed in the job log when the job ends.

19EE: PERMANENT MISCELLANEOUS SPACE
A generic chunk of permanent storage in the form of a Space Object, the simplest of all object types.

19A1: PERMANENT GENERIC SPACE
Similar to PERMANENT MISCELLANEOUS SPACE.

19FC: PROTECTED SPACE
Used for **OPEN** instances of ***non-***database files.

01EF: TEMPORARY - ACCESS GROUP
Jobs′ PAGs (Process Access Groups).

1AEF: TEMPORARY - PROCESS CTL SPACE
The large collection of internal segments that hold execution/activation information about jobs′ active or executing programs (that is, invocation stack areas, STATIC storage areas, HEAP storage areas, Activation Group information, and so on).

19EF: TEMPORARY - SPACE
A generic chunk of temporary storage in the form of a Space Object, the simplest of all object types.

19C2: SPOOL CTL BLOCK
The control block every job has to keep track of spooled files it may have created.

19D0: WORK CONTROL BLOCK TABLE
The system wide Work Management control block that keeps information about every ″Job In System″ (both active jobs and ended jobs that have spooled files). This object can be larger than the

current ″Jobs In System″ because it tends to grow to the high water mark of ″Jobs In System″. The system values QTOTJOB and QADLTOTJOB tend to affect its size also.

See also Section 9.5.3.7, “Reads (*RS, *RSF) Against QWCBTxx Objects” on page 240.

9.6.3 Some Common Segment Types

This topic describes some common ***segment types*** that might appear in query output that contains segment types. Many of the segment types are parts of MI objects. In such case, the queries probably replicate the MI object type we have previously described in this chapter. Also, many stand-alone segment types are rather obscure (rarely used and not well known). The following table lists only a few ″popular″ segment types (some segment types that are always part of MI objects and some stand-alone segment types).

Each item in the following list is preceded by the internal segment type 4 hex char number. These numbers match the data found in column 65 through column 68 of a PRTPEXRPT.

0003: DATA SPACE RECORDS
The specific segments within a COMPOSITE PIECE - DATA SPACE (previously described in this chapter) that contains the actual records.

0006: IWA
The segment that contains the ″true″ (internal) invocation stack (**I**nvocation **W**ork **A**rea). This ″true″ invocation stack includes both MI programs (applications, OS/400, LPPs) and LIC program invocation information.

0079: HEAP CONTROL SEG MI OBJ, 007A: HEAP DATA SEG MI OBJ
Segments that are part of above-the-MI heaps.

007C: USER-DOMAIN PROCESS SEG
Segments used to hold user domain (that is, non OS/400, LPP) program variables (automatic, static, and some heap).

007B: LIC ADDR PROCESS SEG
Segments used to hold LIC program variables (automatic, static, and some heap) for LIC programs running in a job.

007D: SYSTEM-DOMAIN PROCESS SEG
Segments used to hold system domain (that is, OS/400, LPP) program variables (automatic, static, and some heap).

2080: MWS, 20AA: MWS CREATED BLOCK
The LIC internal storage chunks (of machine-wide storage) used primarily by AS/400 communications support to hold such data as buffered input, buffered output, info (messages) to pass between communications tasks.

20AB: MWS AREA CTL SID, 20AC: MWS AREA DATA SID
Same as the MWS ″chunks″ just described.

2081: HOLD RECORD SEG
The segments used to keep track of all LOCKs and SEIZEs active on a machine.

2082: ACTIVE DEVICE LIST
The LIC internal control block that keeps track of all varied-on device descriptions.

2083: DB IN USE TABLE

The LIC internal control block that keeps trace of all open physical file members and access paths in use.

20A1: LOAD DUMP SID

Storage used during a SAVE/RESTORE session.

20B1: DATA SPACE RUN TIME SID

The LIC internal control block created and attached to every data space (physical file member records) the first time the data space is ″touched″ in an IPL.

20B6: DATA SPACE INDEX RUN TIME SID

The LIC internal control block created and attached to every data space index (key portion of a keyed physical or logical file member) the first time the data space index is ″touched″ in an IPL.

20D5: HEAP CONTROL SEGMENT, 20D6: HEAP DATA SEGMENT TYPE

Segments that are part of LIC internal heaps.

20D9: TOMBSTONE SEGMENT

A tombstone segment is used within a job to manage invocation pointers (pointers to program invocations that are temporal in nature).

9.7 MI Object Types

This topic lists MI object types. For a further description, please refer to Chapter 16 of the *OS/400 Diagnostics Aids Manual*, LY44-4907-00.

Note: System Objects are defined by a two-digit object type code followed by a two-digit object subtype code.

For Example:

- 0B90 is the object type/subtype of the data space portion of a physical file.
- 0C90 is the data space index portion of a physical or logical file.

The following table lists all of the object types available.

Table 17 (Page 1 of 2). List of System Object Types

Type	Name
01	Access group
02	Program
03	Module
04	Context, permanent or temporary
06	Byte string space
07	Journal space
08	User profile
09	Journal port
0A	Queue
0B	Data space
0C	Data space index
0D	Cursor
0E	Index

Table 17 (Page 2 of 2). List of System Object Types	
Type	**Name**
0F	Commit block
10	Logical unit description
11	Network description
12	Controller description
13	Dump space
14	Service description
15	Mode description
16	Network interface description
17	Connection list
18	Queue space
19	Space
1A	Process control space
1B	Authorization list
1C	Spelling aid dictionary
1D	Auxiliary server description
1E	Stream file
81	Machine context

This table is reproduced in Appendix E, “Performance Explorer Tables” on page 495 for ease of reference when reviewing PRTPEXRPT output in the customer environment.

Chapter 10. Examples of PEX TRACE Reports

This chapter contains the complete list of reports that are produced for each of the PEXTRC02 menu reports. The topics are in the same sequence as the report command options shown on the PEXTRC02 menu. See the example descriptions for some of the reports within each option in Chapter 9, “Interpreting Enhanced PEX TRACE Reports” on page 193.

You also need to use the topics and tables contained in the following list to interpret the reports shown in this chapter:

- Section 9.5.3, “″Bad″ DASD I/Os” on page 238
- Section 9.6, “Object Names and Types Appearing in TRACE Reports” on page 242
- Section 9.6.2, “Object and Segment Types Appearing in TRACE Reports” on page 243
- Section 9.6.3, “Some Common Segment Types” on page 245
- Appendix A, “AS/400 MI Complex Instructions (Partial List)” on page 433
- Appendix B, “AS/400 Modules (Partial List)” on page 437
- Appendix C, “AS/400 LIC Tasks (Partial List)” on page 485
- Appendix E, “Performance Explorer Tables” on page 495

Note: IBM devlopment has determined not to document descriptions for the SLIC program/module names that appear in some of the reports. Examples of these include: IxRadix3, #domptr, #dbixuse, RmslHold, #aixxxxx, and VBNxxxx.

10.1 Full File Opens (OPENS Command)

This section provides an example of every report you can produce using this command.

Please refer to Section 6.6.1, “OPENS Reporting Command” on page 147 for details of how to use the OPENS command to produce these reports.

Refer to Table 13 on page 168 for details of the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

Notes:

1. All reports produced from the OPENS command specify ″Full xxx Opens″ in the title, where ″xxx″ is:
 a. ″All″ if you selected *ALL for the ″Type of Opens″ on the OPENS command.
 b. ″DB″ if you selected *DB for the ″Type of Opens″ on the OPENS command.
 c. ″NDB″ if you selected *NDB for the ″Type of Opens″ on the OPENS command.
2. All examples in this book were produced using ′*DB′ (Database) for the ″Type of Opens″ on the OPENS command.

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10.1.1 Report Title - Percent xxx Full Opens by Job

Note: Since full database file opens were chosen for this example, the ″xxx″ in the sample report shows ″DB″.

```
                                    Percent Full DB Opens
                                    by
                                    Job
                             QUERY NAME . . . . . OPENADB02
                             LIBRARY NAME . . . . HATT
                             FILE         LIBRARY      MEMBER       FORMAT
                             OPENADB01    PFREXP2      PEXTRACE     OPENADB01
                             OPENADB01    PFREXP2      PEXTRACE     OPENADB01
                             DATE . . . . . . . . 08/02/96
                             TIME . . . . . . . . 18:48:20
                                       Pct Job DB Opens - Part 3

08/02/96  18:48:20  Percent Full DB Opens by Job   PAGE    1
Job                               Full DB   Pct     TDE
                                  Opens     All
                                            Opens
OPENBAD   A960126A  053546          1,850   70.26   00008814
TSTIOC    A960126A  053543            745   28.29   00008810
JUNK      QSPLJOB   053464             30    1.14   00008408
QBRMNET   QPGMR     053289              4     .15   00007F2E
PEXTRACE  A960126A  053555              3     .11   0000881E
SCPF      QSYS      000000              1     .04   000000EC
                      FINAL TOTALS
                      TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 69. Percent Full xxx Opens by Job

10.1.2 Report Title - Percent Full xxx Opens by File

Note: Since full database file opens were chosen for this example, the ″xxx″ in the sample report shows ″DB″.

```
                                    Percent Full DB Opens
                                    by
                                    File
                             QUERY NAME . . . . . OPENADB05
                             LIBRARY NAME . . . . HATT
                             FILE         LIBRARY      MEMBER       FORMAT
                             OPENADB01B   PFREXP2      PEXTRACE     OPENADB01B
                             OPENADB01B   PFREXP2      PEXTRACE     OPENADB01B
                             DATE . . . . . . . . 08/02/96
                             TIME . . . . . . . . 18:48:21
                                       Pct Fil DB Opens - Part 6


08/02/96  18:48:21  Percent Full DB Opens by File  PAGE    1
File                          Full DB   Pct
                              Opens     ALL
                                        Opens
DSPOBJD   DSPOBJD                745   28.29
PF01      PF01                   370   14.05
PF02      PF02                   370   14.05
PF03      PF03                   370   14.05
PF04      PF04                   370   14.05
PF05      PF05                   370   14.05
QATOCTCPIPCONFIG                  18     .68
QATOCLS1  SERVICES                12     .46
QA1ANET   QA1ANET                  4     .15
PF132     PEXTRACSTS               3     .11
QHST96213DQHST96213D               1     .04
               FINAL TOTALS
               TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 70. Percent Full xxx Opens by File

10.1.3 Report Title - Full xxx Opens by File within Job

```
                                        Full DB Opens
                                        File within Job
                                        Descending Job-Opens Sequence
                                  QUERY NAME . . . . . OPENADB12
                                  LIBRARY NAME . . . . HATT
                                  FILE         LIBRARY      MEMBER       FORMAT
                                  OPENADB11    PFREXP2      PEXTRACE     OPENADB11
                                  OPENADB11A   PFREXP2      PEXTRACE     OPENADB11A
                                  DATE . . . . . 08/02/96
                                  TIME . . . . . 18:48:21
                                      Full DB Opens (Desc Job detail) - Part 13


08/02/96  18:48:21  Full DB Opens - File within Job (Descending Job-Opens Sequence)  PAGE    1
Job                      File                          Full DB  Pct ALL   TDE
                                                       Opens    Opens
OPENBAD   A960126A  053546  PF01      PF01                  370    14.05   00008814
                            PF02      PF02                  370    14.05
                            PF03      PF03                  370    14.05
                            PF04      PF04                  370    14.05
                            PF05      PF05                  370    14.05
                                           TOTAL          1,850
TSTIOC    A960126A  053543  DSPOBJD   DSPOBJD               745    28.29   00008810
                                           TOTAL            745
JUNK      QSPLJOB   053464  QATOCTCPIPCONFIG                 18      .68   00008408
                            QATOCLS1  SERVICES               12      .46
                                           TOTAL             30
QBRMNET   QPGMR     053289  QA1ANET   QA1ANET                 4      .15   00007F2E
                                           TOTAL              4
PEXTRACE  A960126A  053555  PF132     PEXTRACSTS              3      .11   0000881E
                                           TOTAL              3
SCPF      QSYS      000000  QHST96213DQHST96213D              1      .04   000000EC
                                           TOTAL              1
                                           FINAL TOTALS
                                           TOTAL          2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 71. Full xxx Opens by File within Job

10.1.4 Report Title - Percent Full xxx Opens by Program within Job

Note: This report is only produced if you specify *YES as the ″Program Call Data″ value on the OPENS command.

```
                                        Percent Full DB Opens
                                        by
                                        Program within Job
                                  QUERY NAME . . . . . OPENADB03
                                  LIBRARY NAME . . . . HATT
                                  FILE         LIBRARY      MEMBER       FORMAT
                                  OPENADB01    PFREXP2      PEXTRACE     OPENADB01
                                  OPENADB01    PFREXP2      PEXTRACE     OPENADB01
                                  DATE . . . . . 08/02/96
                                  TIME . . . . . 18:48:22
                                        Pct Job/Pgm DB Opens - Part 4


08/02/96  18:48:22  Percent Full DB Opens by Program within Job  PAGE    1
Job                      Program           Full DB   Pct     TDE
                                           Opens     ALL
                                                     Opens
OPENBAD   A960126A  053546  OPEN5             1,850   70.26   00008814
TSTIOC    A960126A  053543  TESTIO              745   28.29   00008810
JUNK      QSPLJOB   053464  QDMCOPEN             30    1.14   00008408
QBRMNET   QPGMR     053289  QDMCOPEN              4     .15   00007F2E
PEXTRACE  A960126A  053555  QDMCOPEN              3     .11   0000881E
SCPF      QSYS      000000  QDMCOPEN              1     .04   000000EC
                                 FINAL TOTALS
                                 TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 72. Percent Full xxx Opens by Program within Job

10.1.5 Report Title-Percent Full xxx Opens by File within Program within Job

Note: This report is only produced if you specify *YES as the ″Program Call Data″ value on the OPENS command.

```
                    Percent Full DB Opens
                    by
                    File within Program within Job
             QUERY NAME . . . . . OPENADB04
             LIBRARY NAME . . . . HATT
             FILE         LIBRARY      MEMBER       FORMAT
             OPENADB01    PFREXP2      PEXTRACE     OPENADB01
             OPENADB01    PFREXP2      PEXTRACE     OPENADB01
             DATE . . . . . 08/02/96
             TIME . . . . . 18:48:22
                   Pct Job/Pgm/Fil DB Opens - Part 5


08/02/96  18:48:22      Percent Full DB Opens by File within Program within Job      PAGE    1
Job                         Program     File                          Full DB   Pct     TDE
                                                                      Opens     ALL
                                                                                Opens
TSTIOC    A960126A  053543  TESTIO      DSPOBJD   DSPOBJD                745   28.29   00008810
OPENBAD   A960126A  053546  OPEN5       PF01      PF01                   370   14.05   00008814
OPENBAD   A960126A  053546  OPEN5       PF02      PF02                   370   14.05   00008814
OPENBAD   A960126A  053546  OPEN5       PF03      PF03                   370   14.05   00008814
OPENBAD   A960126A  053546  OPEN5       PF04      PF04                   370   14.05   00008814
OPENBAD   A960126A  053546  OPEN5       PF05      PF05                   370   14.05   00008814
JUNK      QSPLJOB   053464  QDMCOPEN    QATOCTCPIPCONFIG                  18     .68   00008408
JUNK      QSPLJOB   053464  QDMCOPEN    QATOCLS1  SERVICES                12     .46   00008408
QBRMNET   QPGMR     053289  QDMCOPEN    QA1ANET   QA1ANET                  4     .15   00007F2E
PEXTRACE  A960126A  053555  QDMCOPEN    PF132     PEXTRACSTS               3     .11   0000881E
SCPF      QSYS      000000  QDMCOPEN    QHST96213DQHST96213D               1     .04   000000EC
                                                  FINAL TOTALS
                                                  TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 73. Percent Full xxx Opens by File within Program within Job

10.1.6 Report Title - Percent Full xxx Opens by File within Program

Note: This report is only produced if you specify *YES as the ″Program Call Data″ value on the OPENS command.

```
                       Percent Full DB Opens
                       by
                       File within Program
             QUERY NAME . . . . . OPENADB06
             LIBRARY NAME . . . . HATT
             FILE         LIBRARY      MEMBER       FORMAT
             OPENADB01A   PFREXP2      PEXTRACE     OPENADB01A
             OPENADB01A   PFREXP2      PEXTRACE     OPENADB01A
             DATE . . . . . 08/02/96
             TIME . . . . . 18:48:23
                      Pct Pgm/Fil DB Opens - Part 7


08/02/96  18:48:23  Percent Full DB Opens by File within Program  PAGE    1
Program     File                        Full DB   Pct
                                        Opens     ALL
                                                  Opens
TESTIO      DSPOBJD   DSPOBJD               745   28.29
OPEN5       PF01      PF01                  370   14.05
OPEN5       PF02      PF02                  370   14.05
OPEN5       PF03      PF03                  370   14.05
OPEN5       PF04      PF04                  370   14.05
OPEN5       PF05      PF05                  370   14.05
QDMCOPEN    QATOCTCPIPCONFIG                 18     .68
QDMCOPEN    QATOCLS1  SERVICES               12     .46
QDMCOPEN    QA1ANET   QA1ANET                 4     .15
QDMCOPEN    PF132     PEXTRACSTS             3     .11
QDMCOPEN    QHST96213DQHST96213D             1     .04
                      FINAL TOTALS
                      TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 74. Percent Full xxx Opens by File within Program

10.1.7 Report Title - Percent Full xxx Opens by Program within File

Note: This report is only produced if you specify *YES as the ″Program Call Data″ value on the OPENS command.

```
                    Percent Full DB Opens
                    by
                    File/Program
  QUERY NAME . . . . . OPENADB07
  LIBRARY NAME . . . . HATT
  FILE         LIBRARY      MEMBER       FORMAT
  OPENADB01B   PFREXP2      PEXTRACE     OPENADB01B
  OPENADB01B   PFREXP2      PEXTRACE     OPENADB01B
  DATE . . . . . . . . 08/02/96
  TIME . . . . . . . . 18:48:23
               Pct Fil/Pgm Opens - Part 8


08/02/96  18:48:23  Percent Full DB Opens by File/Program  PAGE    1
File                  Program           Full DB   Pct
                                        Opens     ALL
                                                  Opens
DSPOBJD   DSPOBJD     TESTIO               745   28.29
PF01      PF01        OPEN5                370   14.05
PF02      PF02        OPEN5                370   14.05
PF03      PF03        OPEN5                370   14.05
PF04      PF04        OPEN5                370   14.05
PF05      PF05        OPEN5                370   14.05
QATOCTCPIPCONFIG      QDMCOPEN              18     .68
QATOCLS1  SERVICES    QDMCOPEN              12     .46
QA1ANET   QA1ANET     QDMCOPEN               4     .15
PF132     PEXTRACSTS  QDMCOPEN               3     .11
QHST96213DQHST96213D  QDMCOPEN               1     .04
                      FINAL TOTALS
                      TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 75. Percent Full xxx Opens by Program within File

10.1.8 Report Title - Percent Full xxx Opens by Program

Note: This report is only produced if you specify *YES as the ″Program Call Data″ value on the OPENS command.

```
                    Percent Full DB Opens
                    by
                    Program
  QUERY NAME . . . . . OPENADB08
  LIBRARY NAME . . . . HATT
  FILE         LIBRARY      MEMBER       FORMAT
  OPENADB01A   PFREXP2      PEXTRACE     OPENADB01A
  OPENADB01A   PFREXP2      PEXTRACE     OPENADB01A
  DATE . . . . . . . . 08/02/96
  TIME . . . . . . . . 18:48:24
            Pct Pgm DB      Opens - Part 9


08/02/96  18:48:24  Percent Full DB Opens by Program  PAGE    1
Program           Full DB   Pct
                  Opens     ALL
                            Opens
OPEN5               1,850   70.26
TESTIO                745   28.29
QDMCOPEN               38    1.44
      FINAL TOTALS
      TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 76. Percent Full xxx Opens by Program

10.1.9 Report Title - Percent Full xxx Opens by Job within Program within File

Note: This report is only produced if you specify *YES as the ″Program Call Data″ value on the OPENS command.

```
                    Percent Full DB Opens
                    by
                    File/Program/Job
          QUERY NAME . . . . . OPENADB09
          LIBRARY NAME . . . . HATT
          FILE         LIBRARY      MEMBER       FORMAT
          OPENADB01B   PFREXP2      PEXTRACE     OPENADB01B
          OPENADB01B   PFREXP2      PEXTRACE     OPENADB01B
          DATE . . . . . 08/02/96
          TIME . . . . . 18:48:24
                  Pct Fil/Pgm/Job Opens - Part 10


08/02/96  18:48:24            Percent Full DB Opens by File/Program/Job            PAGE    1
File                 Program     Job                                Full DB   Pct     TDE
                                                                    Opens     ALL
                                                                              Opens
DSPOBJD   DSPOBJD    TESTIO      TSTIOC    A960126A  053543            745   28.29   00008810
PF01      PF01       OPEN5       OPENBAD   A960126A  053546            370   14.05   00008814
PF02      PF02       OPEN5       OPENBAD   A960126A  053546            370   14.05   00008814
PF03      PF03       OPEN5       OPENBAD   A960126A  053546            370   14.05   00008814
PF04      PF04       OPEN5       OPENBAD   A960126A  053546            370   14.05   00008814
PF05      PF05       OPEN5       OPENBAD   A960126A  053546            370   14.05   00008814
QATOCTCPIPCONFIG     QDMCOPEN    JUNK      QSPLJOB   053464             18     .68   00008408
QATOCLS1  SERVICES   QDMCOPEN    JUNK      QSPLJOB   053464             12     .46   00008408
QA1ANET   QA1ANET    QDMCOPEN    QBRMNET   QPGMR     053289              4     .15   00007F2E
PF132     PEXTRACSTS QDMCOPEN    PEXTRACE  A960126A  053555              3     .11   0000881E
QHST96213DQHST96213D QDMCOPEN    SCPF      QSYS      000000              1     .04   000000EC
                                              FINAL TOTALS
                                              TOTAL         2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 77. Percent Full xxx Opens by Job within Program within File

10.1.10 Report Title - Detail Full xxx Opens

Note: This report is only produced if you specify *YES as the ″Program Call Data″ value on the OPENS command.

```
                      Detail Full DB Opens
                      Program Sequence
          QUERY NAME . . . . . OPENADB14
          LIBRARY NAME . . . . HATT
          FILE         LIBRARY      MEMBER       FORMAT
          OPENADB13    PFREXP2      PEXTRACE     OPENADB13
          OPENADB13    PFREXP2      PEXTRACE     OPENADB13
          OPENADB01    PFREXP2      PEXTRACE     OPENADB01
          DATE . . . . . 08/02/96
          TIME . . . . . 18:48:25
                      Full DB Opens - Part 15


08/02/96  18:48:25                          Detail Full DB Opens                          PAGE    1
                                            Program Sequence
Program     File                 Job                                DB Opens      PGM       JOB     TDE
                                                                    per           Total     Total
                                                                    JOB/PGM/FILE
OPEN5       PF01       PF01      OPENBAD   A960126A  053546              370      1,850     1,850   00008814
            PF02       PF02      OPENBAD   A960126A  053546              370      1,850     1,850   00008814
            PF03       PF03      OPENBAD   A960126A  053546              370      1,850     1,850   00008814
            PF04       PF04      OPENBAD   A960126A  053546              370      1,850     1,850   00008814
            PF05       PF05      OPENBAD   A960126A  053546              370      1,850     1,850   00008814
QDMCOPEN    PF132      PEXTRACSTS PEXTRACE A960126A  053555                3         38         3   0000881E
            QATOCLS1   SERVICES  JUNK      QSPLJOB   053464               12         38        30   00008408
            QATOCTCPIPCONFIG     JUNK      QSPLJOB   053464               18         38        30   00008408
            QA1ANET    QA1ANET   QBRMNET   QPGMR     053289                4         38         4   00007F2E
            QHST96213DQHST96213D SCPF      QSYS      000000                1         38         1   000000EC
TESTIO      DSPOBJD    DSPOBJD   TSTIOC    A960126A  053543              745        745       745   00008810
                                              FINAL TOTALS
                                              TOTAL             2,633
* * *  E N D  O F  R E P O R T  * * *
```

Figure 78. Detail Full xxx Opens

10.2 Physical Disk I/Os (IOS Command)

This section provides an example of every report you can produce using this command.

Please refer to Section 6.6.2, “IOS Reporting Command” on page 149 for details of how to use the IOS command to produce these reports.

Refer to Table 13 on page 168 for details on the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

10.2.1 Report Title - DASD I/Os - System Wide Summary by I/O Type

This report is produced from All Options on the IOS Command

Note: Only one copy of this report is produced irrespective of how many options are responded to with ″Y″ on the IOS command.

```
                DASD I/Os - system wide summary by I/O type
QUERY NAME . . . . . IOS3
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
IOS1         PFREXP2      PEXTRACE     IOS1
IOS2         PFREXP2      PEXTRACE     IOS2
DATE . . . . . 08/02/96
TIME . . . . . 18:49:37

Type of Dasd  I/O Count  Percent of all        Total pages   Average pages   Minimum pages   Maximum pages
I/O                      system I/Os           transferred   transferred     transferred     transferred
                94,651       100.00            151,175.00          1.60            1.00           31.00
   *RSF S       46,161        48.77             63,853.00          1.38            1.00            4.00
   *WSP S       26,301        27.79             56,960.00          2.17            1.00           31.00
   *RX  A       13,031        13.77             20,338.00          1.56            1.00            8.00
   *RS  S        6,036         6.38              6,747.00          1.12            1.00           12.00
   *RS  A        2,980         3.15              2,993.00          1.00            1.00            6.00
   *WS  S          111          .12                253.00          2.28            1.00           21.00
   *WS  A           18          .02                 18.00          1.00            1.00            1.00
   *WSP A           13          .01                 13.00          1.00            1.00            1.00
* * *  E N D  O F  R E P O R T  * * *
```

Figure 79. DASD I/Os - System Wide Summary by I/O Type

10.2.2 Report Title - DASD I/Os by Job/Task Name and I/O Type

This report is produced from Command Option - By Job/Task Name and I/O Type.

```
DASD I/Os by Job/Task name and I/O type
Includes only TDE's that had 1% or more of all system I/Os
    QUERY NAME . . . . . IOTDE3
    LIBRARY NAME . . . . SMTRACE
    FILE         LIBRARY      MEMBER       FORMAT
    IOTDE2       PFREXP2      PEXTRACE     IOTDE2
    IOTDE1       PFREXP2      PEXTRACE     IOTDE1
    TASKINFO     PFREXP2      PEXTRACE     TASKINFO
    IOTDE1A      PFREXP2      PEXTRACE     IOTDE1A
    DATE . . . . . 08/02/96
    TIME . . . . . 18:50:00
```

TDE number	Job/Task name	Job user	Job number	I/O type	I/O count	Average pages transferred	Percent of this TDE's I/Os	Percent of TOTAL system I/Os
00008810	TSTIOC	A960126A	053543	*RS A	1,370	1.00	6.15	1.45
				*RS S	1,218	1.00	5.47	1.29
				*RSF S	7,724	1.32	34.67	8.16
				*RX A	11,969	1.00	53.72	12.65
					22,281	1.11	100.00	23.54
0000880E	ILEAGNEW	A960126A	053541	*RS S	1,127	1.07	5.74	1.19
				*RSF S	18,500	1.46	94.20	19.55
				*WS S	2	1.50	.01	.00
				*WSP S	10	5.20	.05	.01
					19,639	1.44	100.00	20.75
00008814	OPENBAD	A960126A	053546	*RS A	1,595	1.00	8.13	1.69
				*RS S	3,470	1.04	17.69	3.67
				*RSF S	14,535	1.21	74.10	15.36
				*WSP S	16	9.75	.08	.02
					19,616	1.17	100.00	20.72
00008408	JUNK	QSPLJOB	053464	*RS A	12	1.00	.23	.01
				*RS S	170	3.59	3.27	.18
				*RSF S	4,995	1.72	96.15	5.28
				*WS S	12	8.92	.23	.01
				*WSP S	6	8.83	.12	.01
					5,195	1.80	100.00	5.49
0000006B	SMP00006			*WSP S	3,932	2.20	100.00	4.15
					3,932	2.20	100.00	4.15
00000068	SMP00003			*WSP S	3,853	2.17	100.00	4.07
					3,853	2.17	100.00	4.07
00000069	SMP00004			*WSP S	3,768	2.20	100.00	3.98
					3,768	2.20	100.00	3.98
00000067	SMP00002			*WSP S	3,698	2.14	100.00	3.91
					3,698	2.14	100.00	3.91
00000066	SMP00001			*WSP S	3,670	2.12	100.00	3.88
				M05				

TDE number	Job/Task name	Job user	Job number	I/O type	I/O count	Average pages transferred	Percent of this TDE's I/Os	Percent of TOTAL system I/Os
00000066	SMP00001				3,670	2.12	100.00	3.88
0000006A	SMP00005			*WSP S	3,663	2.15	100.00	3.87
					3,663	2.15	100.00	3.87
0000006C	SMP00007			*WSP S	3,651	2.13	100.00	3.86
					3,651	2.13	100.00	3.86
00007F6C	P23ARTVKE	A960126A	053319	*RS A	3	5.33	.23	.00
				*RS S	14	2.29	1.06	.01
				*RSF S	231	1.03	17.46	.24
				*RX A	1,062	7.88	80.27	1.12
				*WS A	7	1.00	.53	.01
				*WS S	6	1.00	.45	.01
					1,323	6.55	100.00	1.40

```
* * *  E N D  O F  R E P O R T  * * *
```

Figure 80. DASD I/Os by Job/Task Name and I/O Type

10.2.3 Report Title - DASD I/Os by Job/Task and Object Name/Type

This report is produced from Command Option - By Job/Task Name and Object Name.

```
DASD I/Os by Job/Task and Object Name/Type
Only includes Jobs/Tasks that performed 1% or more of all I/Os and
Only include objects that had 1% or more of each Job's/Task's I/Os
       QUERY NAME . . . . . IOTOBJ3
       LIBRARY NAME . . . . SMTRACE
       FILE         LIBRARY      MEMBER       FORMAT
       IOTOBJ2      PFREXP2      PEXTRACE     IOTOBJ2
       IOTOBJ2A     PFREXP2      PEXTRACE     IOTOBJ2A
       IOTOBJ1B     PFREXP2      PEXTRACE     IOTOBJ1B
       TASKINFO     PFREXP2      PEXTRACE     TASKINFO
       IOTOBJ1A     PFREXP2      PEXTRACE     IOTOBJ1A
       DATE . . . . . 08/02/96
       TIME . . . . . 18:50:31
```

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
00008810	TSTIOC	A960126A	053543	11,969	*RX A	DSPOBJD	DSPOBJD	0B90	53.72	12.65
				1,455	*RSF S				6.53	1.54
				1,370	*RS A				6.15	1.45
				473	*RS S				2.12	.50
			TOTAL	15,267					68.52	16.14
				1,929	*RSF S	TESTIO		0201	8.66	2.04
			TOTAL	1,929					8.66	2.04
				1,246	*RSF S	HATT		0401	5.59	1.32
			TOTAL	1,246					5.59	1.32
				871	*RSF S	TESTIOC		0201	3.91	.92
			TOTAL	871					3.91	.92
				745	*RS S	*DESTROYED		0000	3.34	.79
			TOTAL	745					3.34	.79
				447	*RSF S	QDBGETM		0201	2.01	.47
			TOTAL	447					2.01	.47
				404	*RSF S	QDFTOWN		0801	1.81	.43
			TOTAL	404					1.81	.43
				385	*RSF S	DSPOBJD		1901	1.73	.41
			TOTAL	385					1.73	.41
				367	*RSF S	QCAWAREA		19EF	1.65	.39
			TOTAL	367					1.65	.39

```
         M05
```

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
00008810	TSTIOC	A960126A	053543	354	*RSF S	F86D14F54004		0000	1.59	.37
			TOTAL	354					1.59	.37
			TOTAL	22,015					98.81	23.28
0000880E	ILEAGNEW	A960126A	053541	4,543	*RSF S	FCFA2024DA00		0000	23.13	4.80
			TOTAL	4,543					23.13	4.80
				4,090	*RSF S	ILEAGNEW	A960126A	1AEF	20.83	4.32
			TOTAL	4,090					20.83	4.32
				2,063	*RSF S	*DESTROYED		0000	10.50	2.18
			TOTAL	2,063					10.50	2.18
				1,461	*RSF S	ILEAGN		0201	7.44	1.54
			TOTAL	1,461					7.44	1.54
				1,012	*RSF S	QRNXDUMP		0203	5.15	1.07
			TOTAL	1,012					5.15	1.07
				833	*RSF S	QSQENDAG		0201	4.24	.88
			TOTAL	833					4.24	.88
				828	*RSF S	QLEAWI		0203	4.22	.87
			TOTAL	828					4.22	.87
				732	*RSF S	D7A7822472O0		0000	3.73	.77
			TOTAL	732					3.73	.77
				623	*RSF S	C3E62C036004		0000	3.17	.66

Figure 81 (Part 1 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE		Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	623				3.17	.66
0000880E	ILEAGNEW	A960126A	053541	550	*RS S	QWVPDAGE	0201	2.80	.58
			TOTAL	550				2.80	.58
				567	*RSF S	ILEAGNEW	0201	2.89	.60
			TOTAL	567				2.89	.60
				551	*RS S	QUIRCLAP	0201	2.81	.58
			TOTAL	551				2.81	.58
				281	*RSF S	APLIST	19EF	1.43	.30
			TOTAL	281				1.43	.30
				280	*RSF S	D56C3B528F00	0000	1.43	.30
			TOTAL	280				1.43	.30
				276	*RSF S	QCAWAREA	19EF	1.41	.29
			TOTAL	276				1.41	.29
				274	*RSF S	QJOBMSGQ	18A0	1.40	.29
			TOTAL	274				1.40	.29
				272	*RSF S	SEIZE LOCK RANGE	0000	1.38	.29
			TOTAL	272				1.38	.29
			TOTAL	19,236				97.96	20.32
00008814	OPENBAD	A960126A	053546	1,856	*RS S	*DESTROYED	0000	9.46	1.96
				1,789	*RSF S			9.12	1.89
				MO5					

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE		Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	3,645				18.58	3.85
00008814	OPENBAD	A960126A	053546	2,385	*RSF S	OPEN5	0201	12.16	2.52
			TOTAL	2,385				12.16	2.52
				1,187	*RSF S	OPENBAD A960126A	1AEF	6.05	1.25
			TOTAL	1,187				6.05	1.25
				545	*RSF S	PF04 PF04	0B90	2.78	.58
				317	*RS A			1.62	.33
				316	*RS S			1.61	.33
			TOTAL	1,178				6.01	1.24
				522	*RSF S	PF03 PF03	0B90	2.66	.55
				322	*RS A			1.64	.34
				317	*RS S			1.62	.33
			TOTAL	1,161				5.92	1.22
				509	*RSF S	PF05 PF05	0B90	2.59	.54
				318	*RS A			1.62	.34
				317	*RS S			1.62	.33
			TOTAL	1,144				5.83	1.21
				495	*RSF S	PF02 PF02	0B90	2.52	.52
				319	*RS A			1.63	.34
				318	*RS S			1.62	.34
			TOTAL	1,132				5.77	1.20
				469	*RSF S	PF01 PF01	0B90	2.39	.50
				319	*RS A			1.63	.34
				319	*RS S			1.63	.34
			TOTAL	1,107				5.65	1.18
				MO5					

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE		Percent of this TDE's I/Os	Percent of ALL system I/Os
00008814	OPENBAD	A960126A	053546	965	*RSF S	OPENBAD	0201	4.92	1.02
			TOTAL	965				4.92	1.02
				728	*RSF S	SEIZE LOCK RANGE	0000	3.71	.77
			TOTAL	728				3.71	.77
				621	*RSF S	QCAWAREA	19EF	3.17	.66
			TOTAL	621				3.17	.66
				493	*RSF S	F5075E554004	0000	2.51	.52
			TOTAL	493				2.51	.52
				490	*RSF S	FD3057655004	0000	2.50	.52
			TOTAL	490				2.50	.52
				480	*RSF S	C2E7BB3D7004	0000	2.45	.51
			TOTAL	480				2.45	.51
				469	*RSF S	D3334BC40004	0000	2.39	.50
			TOTAL	469				2.39	.50
				457	*RSF S	F3CA6CD12004	0000	2.33	.48
			TOTAL	457				2.33	.48
				308	*RSF S	PF01	1901	1.57	.33
			TOTAL	308				1.57	.33
				308	*RSF S	PF02	1901	1.57	.33
			TOTAL	308				1.57	.33

Figure 81 (Part 2 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE		Percent of this TDE's I/Os	Percent of ALL system I/Os
00008814	OPENBAD	A960126A	053546	306	*RSF S	PF05	1901	1.56	.32
			TOTAL	306				1.56	.32
				305	*RSF S	PF04	1901	1.55	.32
			TOTAL	305				1.55	.32
				304	*RSF S	PF03	1901	1.55	.32
			TOTAL	304				1.55	.32
				265	*RSF S	QUSRSYS	0401	1.35	.28
			TOTAL	265				1.35	.28
			TOTAL	19,438				99.10	20.55
00008408	JUNK	QSPLJOB	053464	787	*RSF S	D2FB76C77200	0000	15.15	.83
			TOTAL	787				15.15	.83
				690	*RSF S	JUNK QSPLJOB	1AEF	13.28	.73
				56	*RS S			1.08	.06
			TOTAL	746				14.36	.79
				371	*RSF S	QSOSRV2	0203	7.14	.39
			TOTAL	371				7.14	.39
				266	*RSF S	QTMPLPRC	0201	5.12	.28
			TOTAL	266				5.12	.28
				239	*RSF S	*DESTROYED	0000	4.60	.25
			TOTAL	239				4.60	.25
				M05					

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE		Percent of this TDE's I/Os	Percent of ALL system I/Os
00008408	JUNK	QSPLJOB	053464	214	*RSF S	QSOKERN3	0203	4.12	.23
			TOTAL	214				4.12	.23
				188	*RSF S	L/L RANGE 1	0000	3.62	.20
			TOTAL	188				3.62	.20
				143	*RSF S	QSOSRV1	0203	2.75	.15
			TOTAL	143				2.75	.15
				139	*RSF S	QJOBMSGQ	18A0	2.68	.15
			TOTAL	139				2.68	.15
				110	*RSF S	SQCCSID1	0ED2	2.12	.12
			TOTAL	110				2.12	.12
				90	*RSF S	E7CB3ED36004	0000	1.73	.10
			TOTAL	90				1.73	.10
				84	*RSF S	CB409AF8A004	0000	1.62	.09
			TOTAL	84				1.62	.09
				84	*RSF S	F4E3FAD8D004	0000	1.62	.09
			TOTAL	84				1.62	.09
				81	*RSF S	QTQICONV	0203	1.56	.09
			TOTAL	81				1.56	.09
				72	*RSF S	QC2UTIL1	0203	1.39	.08
			TOTAL	72				1.39	.08
				M05					

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE		Percent of this TDE's I/Os	Percent of ALL system I/Os
00008408	JUNK	QSPLJOB	053464	72	*RSF S	QPOLLIB1	0203	1.39	.08
			TOTAL	72				1.39	.08
				69	*RSF S	E43BF962E500	0000	1.33	.07
			TOTAL	69				1.33	.07
				52	*RSF S	QATOCTCPIPCONFIG	0B90	1.00	.05
			TOTAL	52				1.00	.05
				67	*RSF S	QATOCTCPIPCONFIG	0C90	1.29	.07
			TOTAL	67				1.29	.07
				66	*RSF S	QYPPRT	0203	1.27	.07
			TOTAL	66				1.27	.07
				61	*RSF S	EEE05252CB00	0000	1.17	.06
			TOTAL	61				1.17	.06
				60	*RSF S	QSO_DNS_INDEX	0EEF	1.15	.06
			TOTAL	60				1.15	.06
				60	*RSF S	SEIZE LOCK RANGE	0000	1.15	.06
			TOTAL	60				1.15	.06
			TOTAL	4,121				79.33	4.36
0000006B	SMP00006			673	*WSP S	ILEAGNEW A960126A	1AEF	17.12	.71
			TOTAL	673				17.12	.71
				532	*WSP S	*DESTROYED	0000	13.53	.56

Figure 81 (Part 3 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	532					13.53	.56
0000006B	SMP00006			523	*WSP S	FCFA2024DA00		0000	13.30	.55
			TOTAL	523					13.30	.55
				185	*WSP S	SEIZE LOCK RANGE		0000	4.70	.20
			TOTAL	185					4.70	.20
				157	*WSP S	QCAWAREA		19EF	3.99	.17
			TOTAL	157					3.99	.17
				114	*WSP S	OPENBAD	A960126A	1AEF	2.90	.12
			TOTAL	114					2.90	.12
				113	*WSP S	C3E62C036004		0000	2.87	.12
			TOTAL	113					2.87	.12
				100	*WSP S	F5075E554004		0000	2.54	.11
			TOTAL	100					2.54	.11
				95	*WSP S	F86D14F54004		0000	2.42	.10
			TOTAL	95					2.42	.10
				93	*WSP S	F3CA6CD12004		0000	2.37	.10
			TOTAL	93					2.37	.10
				92	*WSP S	PFO5	PFO5	0B90	2.34	.10
			TOTAL	92					2.34	.10
				87	*WSP S	FD3057655004		0000	2.21	.09
			MO5							

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	87					2.21	.09
0000006B	SMP00006			85	*WSP S	PFO4	PFO4	0B90	2.16	.09
			TOTAL	85					2.16	.09
				84	*WSP S	QJOBMSGQ		18A0	2.14	.09
			TOTAL	84					2.14	.09
				83	*WSP S	D3334BC40004		0000	2.11	.09
			TOTAL	83					2.11	.09
				83	*WSP S	JUNK	QSPLJOB	1AEF	2.11	.09
			TOTAL	83					2.11	.09
				81	*WSP S	PFO1	PFO1	0B90	2.06	.09
			TOTAL	81					2.06	.09
				80	*WSP S	DSPOBJD	DSPOBJD	0B90	2.03	.08
			TOTAL	80					2.03	.08
				79	*WSP S	PFO3	PFO3	0B90	2.01	.08
			TOTAL	79					2.01	.08
				77	*WSP S	PFO2	PFO2	0B90	1.96	.08
			TOTAL	77					1.96	.08
				76	*WSP S	C2E7BB3D7004		0000	1.93	.08
			TOTAL	76					1.93	.08
				58	*WSP S	QRNXDUMP		0203	1.48	.06
			MO5							

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	58					1.48	.06
0000006B	SMP00006			57	*WSP S	QRNXIE		0203	1.45	.06
			TOTAL	57					1.45	.06
				52	*WSP S	TESTIO		0201	1.32	.05
			TOTAL	52					1.32	.05
				47	*WSP S	OPEN5		0201	1.20	.05
			TOTAL	47					1.20	.05
				41	*WSP S	ILEAGN		0201	1.04	.04
			TOTAL	41					1.04	.04
			TOTAL	3,747					95.29	3.96
00000068	SMP00003			665	*WSP S	ILEAGNEW	A960126A	1AEF	17.26	.70
			TOTAL	665					17.26	.70
				509	*WSP S	*DESTROYED		0000	13.21	.54
			TOTAL	509					13.21	.54
				474	*WSP S	FCFA2024DA00		0000	12.30	.50
			TOTAL	474					12.30	.50
				164	*WSP S	SEIZE LOCK RANGE		0000	4.26	.17
			TOTAL	164					4.26	.17
				146	*WSP S	QCAWAREA		19EF	3.79	.15
			TOTAL	146					3.79	.15

Figure 81 (Part 4 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
00000068	SMPO0003			135	*WSP S	OPENBAD	A960126A	1AEF	3.50	.14
			TOTAL	135					3.50	.14
				110	*WSP S	JUNK	QSPLJOB	1AEF	2.85	.12
			TOTAL	110					2.85	.12
				96	*WSP S	C3E62C036O04		0000	2.49	.10
			TOTAL	96					2.49	.10
				90	*WSP S	QJOBMSGQ		18A0	2.34	.10
			TOTAL	90					2.34	.10
				88	*WSP S	PFO3	PFO3	0B90	2.28	.09
			TOTAL	88					2.28	.09
				85	*WSP S	F5O75E554O04		0000	2.21	.09
			TOTAL	85					2.21	.09
				83	*WSP S	C2E7BB3D7O04		0000	2.15	.09
			TOTAL	83					2.15	.09
				83	*WSP S	PFO1	PFO1	0B90	2.15	.09
			TOTAL	83					2.15	.09
				80	*WSP S	DSPOBJD	DSPOBJD	0B90	2.08	.08
			TOTAL	80					2.08	.08
				80	*WSP S	FD3057655O04		0000	2.08	.08
			TOTAL	80					2.08	.08
				MO5						

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
00000068	SMPO0003			79	*WSP S	D3334BC40O04		0000	2.05	.08
			TOTAL	79					2.05	.08
				79	*WSP S	PFO4	PFO4	0B90	2.05	.08
			TOTAL	79					2.05	.08
				77	*WSP S	D2FB76C772O0		0000	2.00	.08
			TOTAL	77					2.00	.08
				77	*WSP S	F3CA6CD12O04		0000	2.00	.08
			TOTAL	77					2.00	.08
				75	*WSP S	PFO2	PFO2	0B90	1.95	.08
			TOTAL	75					1.95	.08
				71	*WSP S	F86D14F54O04		0000	1.84	.08
			TOTAL	71					1.84	.08
				66	*WSP S	PFO5	PFO5	0B90	1.71	.07
			TOTAL	66					1.71	.07
				59	*WSP S	QRNXDUMP		0203	1.53	.06
			TOTAL	59					1.53	.06
				56	*WSP S	D56C3B528FO0		0000	1.45	.06
			TOTAL	56					1.45	.06
				54	*WSP S	OPEN5		0201	1.40	.06
			TOTAL	54					1.40	.06
				MO5						

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
00000068	SMPO0003			48	*WSP S	TESTIO		0201	1.25	.05
			TOTAL	48					1.25	.05
				39	*WSP S	QRNXIE		0203	1.01	.04
			TOTAL	39					1.01	.04
			TOTAL	3,668					95.19	3.86
00000069	SMPO0004			716	*WSP S	ILEAGNEW	A960126A	1AEF	19.00	.76
			TOTAL	716					19.00	.76
				493	*WSP S	*DESTROYED		0000	13.08	.52
			TOTAL	493					13.08	.52
				414	*WSP S	FCFA2O24DAOO		0000	10.99	.44
			TOTAL	414					10.99	.44
				207	*WSP S	SEIZE LOCK RANGE		0000	5.49	.22
			TOTAL	207					5.49	.22
				130	*WSP S	QCAWAREA		19EF	3.45	.14
			TOTAL	130					3.45	.14
				127	*WSP S	OPENBAD	A960126A	1AEF	3.37	.13
			TOTAL	127					3.37	.13
				111	*WSP S	C3E62C036O04		0000	2.95	.12
			TOTAL	111					2.95	.12
				102	*WSP S	JUNK	QSPLJOB	1AEF	2.71	.11

Figure 81 (Part 5 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	102					2.71	.11
00000069	SMP00004			94	*WSP	S QJOBMSGQ		18A0	2.49	.10
			TOTAL	94					2.49	.10
				91	*WSP	S F86D14F54004		0000	2.42	.10
			TOTAL	91					2.42	.10
				88	*WSP	S D3334BC40004		0000	2.34	.09
			TOTAL	88					2.34	.09
				85	*WSP	S PFO5	PFO5	0B90	2.26	.09
			TOTAL	85					2.26	.09
				84	*WSP	S PFO3	PFO3	0B90	2.23	.09
			TOTAL	84					2.23	.09
				78	*WSP	S C2E7BB3D7004		0000	2.07	.08
			TOTAL	78					2.07	.08
				78	*WSP	S F5075E554004		0000	2.07	.08
			TOTAL	78					2.07	.08
				76	*WSP	S FD3057655004		0000	2.02	.08
			TOTAL	76					2.02	.08
				72	*WSP	S DSPOBJD	DSPOBJD	0B90	1.91	.08
			TOTAL	72					1.91	.08
				69	*WSP	S F3CA6CD12004		0000	1.83	.07
			MO5							

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	69					1.83	.07
00000069	SMP00004			69	*WSP	S PFO4	PFO4	0B90	1.83	.07
			TOTAL	69					1.83	.07
				65	*WSP	S PFO2	PFO2	0B90	1.73	.07
			TOTAL	65					1.73	.07
				63	*WSP	S QRNXDUMP		0203	1.67	.07
			TOTAL	63					1.67	.07
				62	*WSP	S PFO1	PFO1	0B90	1.65	.07
			TOTAL	62					1.65	.07
				49	*WSP	S QRNXIE		0203	1.30	.05
			TOTAL	49					1.30	.05
				47	*WSP	S D2FB76C77200		0000	1.25	.05
			TOTAL	47					1.25	.05
				41	*WSP	S D7A782247200		0000	1.09	.04
			TOTAL	41					1.09	.04
				39	*WSP	S TESTIO		0201	1.04	.04
			TOTAL	39					1.04	.04
				38	*WSP	S ILEAGN		0201	1.01	.04
			TOTAL	38					1.01	.04
			TOTAL	3,588					95.25	3.80
			MO5							

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
00000067	SMP00002			649	*WSP	S ILEAGNEW	A960126A	1AEF	17.55	.69
			TOTAL	649					17.55	.69
				502	*WSP	S FCFA2024DA00		0000	13.57	.53
			TOTAL	502					13.57	.53
				457	*WSP	S *DESTROYED		0000	12.36	.48
			TOTAL	457					12.36	.48
				169	*WSP	S SEIZE LOCK RANGE		0000	4.57	.18
			TOTAL	169					4.57	.18
				123	*WSP	S QCAWAREA		19EF	3.33	.13
			TOTAL	123					3.33	.13
				117	*WSP	S OPENBAD	A960126A	1AEF	3.16	.12
			TOTAL	117					3.16	.12
				110	*WSP	S JUNK	QSPLJOB	1AEF	2.97	.12
			TOTAL	110					2.97	.12
				107	*WSP	S QJOBMSGQ		18A0	2.89	.11
			TOTAL	107					2.89	.11
				98	*WSP	S C3E62C036004		0000	2.65	.10
			TOTAL	98					2.65	.10
				94	*WSP	S C2E7BB3D7004		0000	2.54	.10
			TOTAL	94					2.54	.10

Figure 81 (Part 6 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
00000067	SMPO0002			94	*WSP S	F86D14F5400 4		0000	2.54	.10
			TOTAL	94					2.54	.10
				82	*WSP S	F3CA6CD1200 4		0000	2.22	.09
			TOTAL	82					2.22	.09
				80	*WSP S	FD3057655004		0000	2.16	.08
			TOTAL	80					2.16	.08
				80	*WSP S	PFO2	PFO2	0B90	2.16	.08
			TOTAL	80					2.16	.08
				80	*WSP S	PFO3	PFO3	0B90	2.16	.08
			TOTAL	80					2.16	.08
				79	*WSP S	F5O75E554004		0000	2.14	.08
			TOTAL	79					2.14	.08
				75	*WSP S	D3334BC40004		0000	2.03	.08
			TOTAL	75					2.03	.08
				70	*WSP S	PFO4	PFO4	0B90	1.89	.07
			TOTAL	70					1.89	.07
				68	*WSP S	PFO5	PFO5	0B90	1.84	.07
			TOTAL	68					1.84	.07
				65	*WSP S	PFO1	PFO1	0B90	1.76	.07
			TOTAL	65					1.76	.07

MO5

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
00000067	SMPO0002			61	*WSP S	DSPOBJD	DSPOBJD	0B90	1.65	.06
			TOTAL	61					1.65	.06
				54	*WSP S	TESTIO		0201	1.46	.06
			TOTAL	54					1.46	.06
				49	*WSP S	OPEN5		0201	1.33	.05
			TOTAL	49					1.33	.05
				49	*WSP S	QRNXDUMP		0203	1.33	.05
			TOTAL	49					1.33	.05
				49	*WSP S	QRNXIE		0203	1.33	.05
			TOTAL	49					1.33	.05
				40	*WSP S	D7A7822472O0		0000	1.08	.04
			TOTAL	40					1.08	.04
				38	*WSP S	D2FB76C772O0		0000	1.03	.04
			TOTAL	38					1.03	.04
				38	*WSP S	D56C3B528FO0		0000	1.03	.04
			TOTAL	38					1.03	.04
				37	*WSP S	ILEAGN		0201	1.00	.04
			TOTAL	37					1.00	.04
			TOTAL	3,614					97.73	3.79
00000066	SMPO0001			650	*WSP S	ILEAGNEW	A960126A	1AEF	17.71	.69

MO5

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	650					17.71	.69
00000066	SMPO0001			485	*WSP S	*DESTROYED		0000	13.22	.51
			TOTAL	485					13.22	.51
				484	*WSP S	FCFA2O24DA0O		0000	13.19	.51
			TOTAL	484					13.19	.51
				146	*WSP S	SEIZE LOCK RANGE		0000	3.98	.15
			TOTAL	146					3.98	.15
				141	*WSP S	QCAWAREA		19EF	3.84	.15
			TOTAL	141					3.84	.15
				123	*WSP S	C3E62CO36004		0000	3.35	.13
			TOTAL	123					3.35	.13
				113	*WSP S	OPENBAD	A960126A	1AEF	3.08	.12
			TOTAL	113					3.08	.12
				108	*WSP S	JUNK	QSPLJOB	1AEF	2.94	.11
			TOTAL	108					2.94	.11
				87	*WSP S	C2E7BB3D7004		0000	2.37	.09
			TOTAL	87					2.37	.09
				83	*WSP S	QJOBMSGQ		18A0	2.26	.09
			TOTAL	83					2.26	.09
				81	*WSP S	F86D14F5400 4		0000	2.21	.09

Figure 81 (Part 7 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	81					2.21	.09
00000066	SMP00001			79	*WSP S	PF05	PF05	0B90	2.15	.08
			TOTAL	79					2.15	.08
				77	*WSP S	D3334BC40004		0000	2.10	.08
			TOTAL	77					2.10	.08
				73	*WSP S	FD3057655004		0000	1.99	.08
			TOTAL	73					1.99	.08
				72	*WSP S	DSPOBJD	DSPOBJD	0B90	1.96	.08
			TOTAL	72					1.96	.08
				70	*WSP S	F5075E554004		0000	1.91	.07
			TOTAL	70					1.91	.07
				70	*WSP S	PF04	PF04	0B90	1.91	.07
			TOTAL	70					1.91	.07
				65	*WSP S	F3CA6CD12004		0000	1.77	.07
			TOTAL	65					1.77	.07
				64	*WSP S	PF01	PF01	0B90	1.74	.07
			TOTAL	64					1.74	.07
				63	*WSP S	PF02	PF02	0B90	1.72	.07
			TOTAL	63					1.72	.07
				63	*WSP S	PF03	PF03	0B90	1.72	.07
			M05							

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	63					1.72	.07
00000066	SMP00001			56	*WSP S	QRNXDUMP		0203	1.53	.06
			TOTAL	56					1.53	.06
				54	*WSP S	TESTIO		0201	1.47	.06
			TOTAL	54					1.47	.06
				50	*WSP S	ILEAGN		0201	1.36	.05
			TOTAL	50					1.36	.05
				46	*WSP S	OPEN5		0201	1.25	.05
			TOTAL	46					1.25	.05
				45	*WSP S	QRNXIE		0203	1.23	.05
			TOTAL	45					1.23	.05
				39	*WSP S	D56C3B528F00		0000	1.06	.04
			TOTAL	39					1.06	.04
				38	*WSP S	D2FB76C77200		0000	1.04	.04
			TOTAL	38					1.04	.04
			TOTAL	3,525					96.06	3.73
0000006A	SMP00005			613	*WSP S	ILEAGNEW	A960126A	1AEF	16.73	.65
			TOTAL	613					16.73	.65
				483	*WSP S	*DESTROYED		0000	13.19	.51
			TOTAL	483					13.19	.51
			M05							

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
0000006A	SMP00005			469	*WSP S	FCFA2024DA00		0000	12.80	.50
			TOTAL	469					12.80	.50
				158	*WSP S	SEIZE LOCK RANGE		0000	4.31	.17
			TOTAL	158					4.31	.17
				146	*WSP S	QCAWAREA		19EF	3.99	.15
			TOTAL	146					3.99	.15
				132	*WSP S	OPENBAD	A960126A	1AEF	3.60	.14
			TOTAL	132					3.60	.14
				114	*WSP S	JUNK	QSPLJOB	1AEF	3.11	.12
			TOTAL	114					3.11	.12
				109	*WSP S	C3E62C036004		0000	2.98	.12
			TOTAL	109					2.98	.12
				102	*WSP S	F5075E554004		0000	2.78	.11
			TOTAL	102					2.78	.11
				86	*WSP S	F86D14F54004		0000	2.35	.09
			TOTAL	86					2.35	.09
				84	*WSP S	QJOBMSGQ		18A0	2.29	.09
			TOTAL	84					2.29	.09
				81	*WSP S	C2E7BB3D7004		0000	2.21	.09
			TOTAL	81					2.21	.09

Figure 81 (Part 8 of 10). DASD I/Os by Job/Task and Object Name/Type

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
0000006A	SMPO0005			76	*WSP S	PFO4	PFO4	0B90	2.07	.08
			TOTAL	76					2.07	.08
				72	*WSP S	D3334BC40004		0000	1.97	.08
			TOTAL	72					1.97	.08
				72	*WSP S	FD3057655004		0000	1.97	.08
			TOTAL	72					1.97	.08
				71	*WSP S	DSPOBJD	DSPOBJD	0B90	1.94	.08
			TOTAL	71					1.94	.08
				69	*WSP S	PFO5	PFO5	0B90	1.88	.07
			TOTAL	69					1.88	.07
				65	*WSP S	F3CA6CD12004		0000	1.77	.07
			TOTAL	65					1.77	.07
				64	*WSP S	QRNXDUMP		0203	1.75	.07
			TOTAL	64					1.75	.07
				63	*WSP S	PFO1	PFO1	0B90	1.72	.07
			TOTAL	63					1.72	.07
				61	*WSP S	PFO2	PFO2	0B90	1.67	.06
			TOTAL	61					1.67	.06
				60	*WSP S	D2FB76C77200		0000	1.64	.06
			TOTAL	60					1.64	.06

M05

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
0000006A	SMPO0005			59	*WSP S	PFO3	PFO3	0B90	1.61	.06
			TOTAL	59					1.61	.06
				49	*WSP S	TESTIO		0201	1.34	.05
			TOTAL	49					1.34	.05
				47	*WSP S	QRNXIE		0203	1.28	.05
			TOTAL	47					1.28	.05
				46	*WSP S	OPEN5		0201	1.26	.05
			TOTAL	46					1.26	.05
				40	*WSP S	D7A782247200		0000	1.09	.04
			TOTAL	40					1.09	.04
				39	*WSP S	D56C3B528F00		0000	1.06	.04
			TOTAL	39					1.06	.04
			TOTAL	3,530					96.36	3.75
0000006C	SMPO0007			626	*WSP S	ILEAGNEW	A960126A	1AEF	17.15	.66
			TOTAL	626					17.15	.66
				458	*WSP S	FCFA2024DA00		0000	12.54	.48
			TOTAL	458					12.54	.48
				441	*WSP S	*DESTROYED		0000	12.08	.47
			TOTAL	441					12.08	.47
				162	*WSP S	SEIZE LOCK RANGE		0000	4.44	.17

M05

TDE	Task name	Job user	Job number	NAMETYPE COUNT	OPR	NAMETYPE			Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	162					4.44	.17
0000006C	SMPO0007			152	*WSP S	QCAWAREA		19EF	4.16	.16
			TOTAL	152					4.16	.16
				139	*WSP S	OPENBAD	A960126A	1AEF	3.81	.15
			TOTAL	139					3.81	.15
				103	*WSP S	JUNK	QSPLJOB	1AEF	2.82	.11
			TOTAL	103					2.82	.11
				99	*WSP S	F86D14F54004		0000	2.71	.10
			TOTAL	99					2.71	.10
				98	*WSP S	C3E62C036004		0000	2.68	.10
			TOTAL	98					2.68	.10
				85	*WSP S	QJOBMSGQ		18A0	2.33	.09
			TOTAL	85					2.33	.09
				82	*WSP S	C2E7BB3D7004		0000	2.25	.09
			TOTAL	82					2.25	.09
				82	*WSP S	F5075E554004		0000	2.25	.09
			TOTAL	82					2.25	.09
				79	*WSP S	PFO4	PFO4	0B90	2.16	.08
			TOTAL	79					2.16	.08
				77	*WSP S	D3334BC40004		0000	2.11	.08

Figure 81 (Part 9 of 10). DASD I/Os by Job/Task and Object Name/Type

```
TDE       Task name        Job        Job          NAMETYPE  OPR     NAMETYPE                 Percent of this  Percent of ALL
                           user       number       COUNT                                      TDE's I/Os       system I/Os
                                        TOTAL            77                                          2.11             .08
0000006C  SMP00007                                       72  *WSP S  FD3057655004         0000          1.97             .08
                                        TOTAL            72                                          1.97             .08
                                                         71  *WSP S  PF01      PF01       0B90          1.94             .08
                                        TOTAL            71                                          1.94             .08
                                                         69  *WSP S  D2FB76C77200         0000          1.89             .07
                                        TOTAL            69                                          1.89             .07
                                                         69  *WSP S  PF05      PF05       0B90          1.89             .07
                                        TOTAL            69                                          1.89             .07
                                                         68  *WSP S  PF02      PF02       0B90          1.86             .07
                                        TOTAL            68                                          1.86             .07
                                                         68  *WSP S  QRNXDUMP             0203          1.86             .07
                                        TOTAL            68                                          1.86             .07
                                                         64  *WSP S  F3CA6CD12004         0000          1.75             .07
                                        TOTAL            64                                          1.75             .07
                                                         62  *WSP S  DSPOBJD   DSPOBJD     0B90          1.70             .07
                                        TOTAL            62                                          1.70             .07
                                                         61  *WSP S  PF03      PF03       0B90          1.67             .06
                                        TOTAL            61                                          1.67             .06
                                                         52  *WSP S  D7A782247200         0000          1.42             .05
                                                MO5

TDE       Task name        Job        Job          NAMETYPE  OPR     NAMETYPE                 Percent of this  Percent of ALL
                           user       number       COUNT                                      TDE's I/Os       system I/Os
                                        TOTAL            52                                          1.42             .05
0000006C  SMP00007                                       50  *WSP S  QRNXIE               0203          1.37             .05
                                        TOTAL            50                                          1.37             .05
                                                         47  *WSP S  TESTIO               0201          1.29             .05
                                        TOTAL            47                                          1.29             .05
                                                         43  *WSP S  OPEN5                0201          1.18             .05
                                        TOTAL            43                                          1.18             .05
                                                         38  *WSP S  D56C3B528F00         0000          1.04             .04
                                        TOTAL            38                                          1.04             .04
                                        TOTAL         3,517                                         96.32            3.71
00007F6C  P23ARTVKE        A960126A   053319          1,062  *RX  A  QWCBT01              19D0         80.27            1.12
                                                         99  *RSF S                                     7.48             .10
                                        TOTAL         1,161                                         87.75            1.22
                                        TOTAL         1,161                                         87.75            1.22
                                        FINAL TOTALS
                                        TOTAL        91,160                                      1,135.15           96.33
* * *  E N D  O F  R E P O R T  * * *
```

Figure 81 (Part 10 of 10). DASD I/Os by Job/Task and Object Name/Type

10.2.4 Report Title - DASD I/Os by Job/Task and Dasd Unit (Arm) Number

This report is produced from Command Option - By Job/Task Name and Disk Unit.

```
DASD I/Os by Job/Task and Dasd Unit (arm) number
Only includes Jobs/Tasks that performed 1% or more of all I/Os and
Only include units that had 1% or more of each Job's/Task's I/Os
       QUERY NAME . . . . . IOTUNIT3
       LIBRARY NAME . . . . SMTRACE
       FILE         LIBRARY      MEMBER       FORMAT
       IOTUNIT2     PFREXP2      PEXTRACE     IOTUNIT2
       IOTUNIT2A    PFREXP2      PEXTRACE     IOTUNIT2A
       IOTUNIT1B    PFREXP2      PEXTRACE     IOTUNIT1B
       TASKINFO     PFREXP2      PEXTRACE     TASKINFO
       IOTUNIT1A    PFREXP2      PEXTRACE     IOTUNIT1A
       DATE . . . . . 08/02/96
       TIME . . . . . 18:50:57
```

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
00008810	TSTIOC	A960126A	053543	11,969	*RX A	008	53.72	12.65
				1,997	*RSF S		8.96	2.11
				1,370	*RS A		6.15	1.45
				595	*RS S		2.67	.63
			TOTAL	15,931			71.50	16.84
				2,476	*RSF S	001	11.11	2.62
			TOTAL	2,476			11.11	2.62
				1,406	*RSF S	004	6.31	1.49
			TOTAL	1,406			6.31	1.49
				724	*RSF S	007	3.25	.76
			TOTAL	724			3.25	.76
				442	*RSF S	005	1.98	.47
			TOTAL	442			1.98	.47
				424	*RSF S	006	1.90	.45
			TOTAL	424			1.90	.45
				255	*RSF S	003	1.14	.27
			TOTAL	255			1.14	.27
			TOTAL	21,658			97.19	22.90
0000880E	ILEAGNEW	A960126A	053541	6,291	*RSF S	001	32.03	6.65
			TOTAL	6,291			32.03	6.65
				3,506	*RSF S	003	17.85	3.70
				275	*RS S		1.40	.29

M05

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	3,781			19.25	3.99
0000880E	ILEAGNEW	A960126A	053541	2,733	*RSF S	008	13.92	2.89
				560	*RS S		2.85	.59
			TOTAL	3,293			16.77	3.48
				2,535	*RSF S	005	12.91	2.68
			TOTAL	2,535			12.91	2.68
				1,516	*RSF S	004	7.72	1.60
			TOTAL	1,516			7.72	1.60
				1,320	*RSF S	007	6.72	1.39
			TOTAL	1,320			6.72	1.39
				599	*RSF S	006	3.05	.63
				277	*RS S		1.41	.29
			TOTAL	876			4.46	.92
			TOTAL	19,612			99.86	20.71
00008814	OPENBAD	A960126A	053546	2,169	*RSF S	005	11.06	2.29
				914	*RS S		4.66	.97
				637	*RS A		3.25	.67
			TOTAL	3,720			18.97	3.93
				2,987	*RSF S	007	15.23	3.16
				280	*RS S		1.43	.30
			TOTAL	3,267			16.66	3.46
				2,968	*RSF S	004	15.13	3.14
				280	*RS S		1.43	.30

Figure 82 (Part 1 of 4). DASD I/Os by Job/Task and DASD Unit (Arm) Number

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	3,248			16.56	3.44
00008814	OPENBAD	A960126A	053546	2,696	*RSF S	008	13.74	2.85
				246	*RS S		1.25	.26
			TOTAL	2,942			14.99	3.11
				1,548	*RSF S	006	7.89	1.64
				636	*RS A		3.24	.67
				597	*RS S		3.04	.63
			TOTAL	2,781			14.17	2.94
				1,475	*RSF S	003	7.52	1.56
				890	*RS S		4.54	.94
				322	*RS A		1.64	.34
			TOTAL	2,687			13.70	2.84
				692	*RSF S	001	3.53	.73
				263	*RS S		1.34	.28
			TOTAL	955			4.87	1.01
			TOTAL	19,600			99.92	20.73
00008408	JUNK	QSPLJOB	053464	957	*RSF S	005	18.42	1.01
			TOTAL	957			18.42	1.01
				837	*RSF S	006	16.11	.88
			TOTAL	837			16.11	.88
				825	*RSF S	001	15.88	.87
			TOTAL	825			15.88	.87
				803	*RSF S	008	15.46	.85

M05

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	803			15.46	.85
00008408	JUNK	QSPLJOB	053464	770	*RSF S	003	14.82	.81
			TOTAL	770			14.82	.81
				434	*RSF S	007	8.35	.46
			TOTAL	434			8.35	.46
				369	*RSF S	004	7.10	.39
			TOTAL	369			7.10	.39
			TOTAL	4,995			96.14	5.27
0000006B	SMP00006			813	*WSP S	001	20.68	.86
			TOTAL	813			20.68	.86
				795	*WSP S	008	20.22	.84
			TOTAL	795			20.22	.84
				725	*WSP S	005	18.44	.77
			TOTAL	725			18.44	.77
				550	*WSP S	004	13.99	.58
			TOTAL	550			13.99	.58
				520	*WSP S	003	13.22	.55
			TOTAL	520			13.22	.55
				376	*WSP S	007	9.56	.40
			TOTAL	376			9.56	.40

M05

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
0000006B	SMP00006			153	*WSP S	006	3.89	.16
			TOTAL	153			3.89	.16
			TOTAL	3,932			100.00	4.16
00000068	SMP00003			794	*WSP S	001	20.61	.84
			TOTAL	794			20.61	.84
				783	*WSP S	008	20.32	.83
			TOTAL	783			20.32	.83
				730	*WSP S	005	18.95	.77
			TOTAL	730			18.95	.77
				517	*WSP S	004	13.42	.55
			TOTAL	517			13.42	.55
				507	*WSP S	003	13.16	.54
			TOTAL	507			13.16	.54
				363	*WSP S	007	9.42	.38
			TOTAL	363			9.42	.38
				159	*WSP S	006	4.13	.17
			TOTAL	159			4.13	.17
			TOTAL	3,853			100.01	4.08
00000069	SMP00004			816	*WSP S	001	21.66	.86
			TOTAL	816			21.66	.86

Figure 82 (Part 2 of 4). DASD I/Os by Job/Task and DASD Unit (Arm) Number

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
00000069	SMP00004			729	*WSP S	008	19.35	.77
			TOTAL	729			19.35	.77
				712	*WSP S	005	18.90	.75
			TOTAL	712			18.90	.75
				513	*WSP S	004	13.61	.54
			TOTAL	513			13.61	.54
				503	*WSP S	003	13.35	.53
			TOTAL	503			13.35	.53
				338	*WSP S	007	8.97	.36
			TOTAL	338			8.97	.36
				157	*WSP S	006	4.17	.17
			TOTAL	157			4.17	.17
			TOTAL	3,768			100.01	3.98
00000067	SMP00002			776	*WSP S	001	20.98	.82
			TOTAL	776			20.98	.82
				774	*WSP S	008	20.93	.82
			TOTAL	774			20.93	.82
				657	*WSP S	005	17.77	.69
			TOTAL	657			17.77	.69
				494	*WSP S	004	13.36	.52
			M05					

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
			TOTAL	494			13.36	.52
00000067	SMP00002			470	*WSP S	003	12.71	.50
			TOTAL	470			12.71	.50
				370	*WSP S	007	10.01	.39
			TOTAL	370			10.01	.39
				157	*WSP S	006	4.25	.17
			TOTAL	157			4.25	.17
			TOTAL	3,698			100.01	3.91
00000066	SMP00001			802	*WSP S	001	21.85	.85
			TOTAL	802			21.85	.85
				775	*WSP S	008	21.12	.82
			TOTAL	775			21.12	.82
				684	*WSP S	005	18.64	.72
			TOTAL	684			18.64	.72
				481	*WSP S	004	13.11	.51
			TOTAL	481			13.11	.51
				445	*WSP S	003	12.13	.47
			TOTAL	445			12.13	.47
				335	*WSP S	007	9.13	.35
			TOTAL	335			9.13	.35
			M05					

TDE	Task name	Job user	Job number	UNIT COUNT	OPR	UNIT	Percent of this TDE's I/Os	Percent of ALL system I/Os
00000066	SMP00001			148	*WSP S	006	4.03	.16
			TOTAL	148			4.03	.16
			TOTAL	3,670			100.01	3.88
0000006A	SMP00005			777	*WSP S	001	21.21	.82
			TOTAL	777			21.21	.82
				732	*WSP S	008	19.98	.77
			TOTAL	732			19.98	.77
				679	*WSP S	005	18.54	.72
			TOTAL	679			18.54	.72
				513	*WSP S	004	14.00	.54
			TOTAL	513			14.00	.54
				474	*WSP S	003	12.94	.50
			TOTAL	474			12.94	.50
				340	*WSP S	007	9.28	.36
			TOTAL	340			9.28	.36
				148	*WSP S	006	4.04	.16
			TOTAL	148			4.04	.16
			TOTAL	3,663			99.99	3.87
0000006C	SMP00007			766	*WSP S	008	20.98	.81
			TOTAL	766			20.98	.81

Figure 82 (Part 3 of 4). DASD I/Os by Job/Task and DASD Unit (Arm) Number

```
TDE       Task name         Job         Job             UNIT   OPR     UNIT  Percent of this  Percent of ALL
                            user        number          COUNT                TDE's I/Os       system I/Os
0000006C  SMP00007                                      734  *WSP S  001           20.10             .78
                                      TOTAL             734                        20.10             .78
                                                        705  *WSP S  005           19.31             .74
                                      TOTAL             705                        19.31             .74
                                                        508  *WSP S  004           13.91             .54
                                      TOTAL             508                        13.91             .54
                                                        473  *WSP S  003           12.96             .50
                                      TOTAL             473                        12.96             .50
                                                        324  *WSP S  007            8.87             .34
                                      TOTAL             324                         8.87             .34
                                                        141  *WSP S  006            3.86             .15
                                      TOTAL             141                         3.86             .15
                                      TOTAL           3,651                        99.99            3.86
00007F6C  P23ARTVKE         A960126A    053319          318  *RX  A  006           24.04             .34
                                                         54  *RSF S                  4.08             .06
                                      TOTAL             372                        28.12             .40
                                                        326  *RX  A  005           24.64             .34
                                                         21  *RSF S                  1.59             .02
                                      TOTAL             347                        26.23             .36
                                                        129  *RX  A  001            9.75             .14
                                                         24  *RSF S                  1.81             .03
                                              M05

TDE       Task name         Job         Job             UNIT   OPR     UNIT  Percent of this  Percent of ALL
                            user        number          COUNT                TDE's I/Os       system I/Os
                                      TOTAL             153                        11.56             .17
00007F6C  P23ARTVKE         A960126A    053319           75  *RX  A  008            5.67             .08
                                                         41  *RSF S                  3.10             .04
                                      TOTAL             116                         8.77             .12
                                                         84  *RX  A  007            6.35             .09
                                                         28  *RSF S                  2.12             .03
                                      TOTAL             112                         8.47             .12
                                                         74  *RX  A  003            5.59             .08
                                                         33  *RSF S                  2.49             .03
                                      TOTAL             107                         8.08             .11
                                                         56  *RX  A  004            4.23             .06
                                                         30  *RSF S                  2.27             .03
                                      TOTAL              86                         6.50             .09
                                      TOTAL           1,293                        97.73            1.37
                                      FINAL TOTALS
                                      TOTAL          93,393                     1,190.86           98.72
* * *  E N D  O F  R E P O R T  * * *
```

Figure 82 (Part 4 of 4). DASD I/Os by Job/Task and DASD Unit (Arm) Number

10.2.5 Report Title - DASD I/Os by Job/Task and Mainstore Pool Number

This report is produced from Command Option - By Job/Task Name + Mainstore Pool.

DASD I/Os by Job/Task and Mainstore Pool Number

```
                    DASD I/Os by Job/Task and Mainstore Pool Number
                    Only includes Jobs/Tasks that performed 1% or more of all I/Os and
                    Only include pools that had 1% or more of each Job's/Task's I/Os
                           QUERY NAME . . . . . IOTPOOL3
                           LIBRARY NAME . . . . SMTRACE
                           FILE         LIBRARY      MEMBER       FORMAT
                           IOTPOOL2     PFREXP2      PEXTRACE     IOTPOOL2
                           IOTPOOL2A    PFREXP2      PEXTRACE     IOTPOOL2A
                           IOTPOOL1B    PFREXP2      PEXTRACE     IOTPOOL1B
                           TASKINFO     PFREXP2      PEXTRACE     TASKINFO
                           IOTPOOL1A    PFREXP2      PEXTRACE     IOTPOOL1A
                           DATE . . . . . 08/02/96
                           TIME . . . . . 18:51:20

TDE       Task name       Job        Job            POOL   OPR     POOL  Percent of this  Percent of ALL
                          user       number         COUNT                TDE's I/Os       system I/Os
00008810  TSTIOC          A960126A   053543        11,969  *RX  A   07          53.72           12.65
                                                    7,724  *RSF S               34.67            8.16
                                                    1,370  *RS  A                6.15            1.45
                                                    1,218  *RS  S                5.47            1.29
                                     TOTAL         22,281                      100.01           23.55
                                     TOTAL         22,281                      100.01           23.55
0000880E  ILEAGNEW        A960126A   053541        18,499  *RSF S   07          94.20           19.54
                                                    1,127  *RS  S                5.74            1.19
                                     TOTAL         19,626                       99.94           20.73
                                     TOTAL         19,626                       99.94           20.73
00008814  OPENBAD         A960126A   053546        14,532  *RSF S   07          74.08           15.35
                                                    3,470  *RS  S               17.69            3.67
                                                    1,595  *RS  A                8.13            1.69
                                     TOTAL         19,597                       99.90           20.71
                                     TOTAL         19,597                       99.90           20.71
00008408  JUNK            QSPLJOB    053464         4,995  *RSF S   03          96.15            5.28
                                                      170  *RS  S                3.27             .18
                                     TOTAL          5,165                       99.42            5.46
                                     TOTAL          5,165                       99.42            5.46
0000006B  SMPO0006                                  3,662  *WSP S   07          93.13            3.87
                                     TOTAL          3,662                       93.13            3.87
                                                      208  *WSP S   03           5.29             .22
                                     TOTAL            208                       5.29             .22
                                              MO5


TDE       Task name       Job        Job            POOL   OPR     POOL  Percent of this  Percent of ALL
                          user       number         COUNT                TDE's I/Os       system I/Os
0000006B  SMPO0006                                     50  *WSP S   04           1.27             .05
                                     TOTAL             50                       1.27             .05
                                     TOTAL          3,920                      99.69            4.14
00000068  SMPO0003                                  3,487  *WSP S   07          90.50            3.68
                                     TOTAL          3,487                       90.50            3.68
                                                      304  *WSP S   03           7.89             .32
                                     TOTAL            304                       7.89             .32
                                                       45  *WSP S   04           1.17             .05
                                     TOTAL             45                       1.17             .05
                                     TOTAL          3,836                       99.56            4.05
00000069  SMPO0004                                  3,439  *WSP S   07          91.27            3.63
                                     TOTAL          3,439                       91.27            3.63
                                                      265  *WSP S   03           7.03             .28
                                     TOTAL            265                       7.03             .28
                                                       54  *WSP S   04           1.43             .06
                                     TOTAL             54                       1.43             .06
                                     TOTAL          3,758                       99.73            3.97
00000067  SMPO0002                                  3,385  *WSP S   07          91.54            3.58
                                     TOTAL          3,385                       91.54            3.58
                                                      244  *WSP S   03           6.60             .26
```

Figure 83 (Part 1 of 2).

```
TDE       Task name         Job        Job            POOL   OPR     POOL  Percent of this  Percent of ALL
                            user       number         COUNT                TDE's I/Os       system I/Os
                                         TOTAL          244                        6.60             .26
00000067  SMP00002                                      61  *WSP S   04            1.65             .06
                                         TOTAL           61                        1.65             .06
                                         TOTAL        3,690                       99.79            3.90
00000066  SMP00001                                   3,360  *WSP S   07           91.55            3.55
                                         TOTAL        3,360                       91.55            3.55
                                                        256  *WSP S   03            6.98             .27
                                         TOTAL          256                        6.98             .27
                                                         40  *WSP S   04            1.09             .04
                                         TOTAL           40                        1.09             .04
                                         TOTAL        3,656                       99.62            3.86
0000006A  SMP00005                                   3,320  *WSP S   07           90.64            3.51
                                         TOTAL        3,320                       90.64            3.51
                                                        288  *WSP S   03            7.86             .30
                                         TOTAL          288                        7.86             .30
                                                         41  *WSP S   04            1.12             .04
                                         TOTAL           41                        1.12             .04
                                         TOTAL        3,649                       99.62            3.85
0000006C  SMP00007                                   3,315  *WSP S   07           90.80            3.50
                                         TOTAL        3,315                       90.80            3.50
                                                 M05

TDE       Task name         Job        Job            POOL   OPR     POOL  Percent of this  Percent of ALL
                            user       number         COUNT                TDE's I/Os       system I/Os
0000006C  SMP00007                                     276  *WSP S   03            7.56             .29
                                         TOTAL          276                        7.56             .29
                                                         47  *WSP S   04            1.29             .05
                                         TOTAL           47                        1.29             .05
                                         TOTAL        3,638                       99.65            3.84
00007F6C  P23ARTVKE         A960126A   053319         1,062  *RX  A   04           80.27            1.12
                                                        222  *RSF S                16.78             .23
                                                         14  *RS  S                 1.06             .01
                                         TOTAL        1,298                       98.11            1.36
                                         TOTAL        1,298                       98.11            1.36
                                         FINAL TOTALS
                                         TOTAL       94,114                    1,195.04           99.42
* * *  E N D  O F  R E P O R T  * * *



                                                 M05
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Figure 83 (Part 2 of 2).

10.2.6 Report Title - Objects with 100 or More DASD I/Os

This report is produced from Command Option - Objects with 100+ I/Os.

Objects with 100 or More DASD I/Os

```
                    Objects with 100 or more DASD I/Os
                 QUERY NAME . . . . . IOOBJ2
                 LIBRARY NAME . . . . SMTRACE
                 FILE         LIBRARY      MEMBER       FORMAT
                 IOOBJ1B      PFREXP2      PEXTRACE     IOOBJ1B
                 IOOBJ1       PFREXP2      PEXTRACE     IOOBJ1
                 IOOBJ1A      PFREXP2      PEXTRACE     IOOBJ1A
                 DATE . . . . . 08/02/96
                 TIME . . . . . 18:51:47


Object name                    I/O    I/O     Average            Percent of
and type                       count  type    pages transferred  all system
                                              per I/O            I/Os
DSPOBJD   DSPOBJD    0B90       1,370  *RS  A          1.00             1.45
                                  473  *RS  S          1.00              .50
                                1,455  *RSF S          1.00             1.54
                               11,969  *RX  A          1.00            12.65
                                  498  *WSP S          1.00              .53
                   TOTAL       15,765                                  16.67
*DESTROYED         0000        2,602  *RS  S          1.00             2.75
                               4,204  *RSF S          1.00             4.44
                                   2  *WS  A          1.00              .00
                                   1  *WS  S          1.00              .00
                               3,400  *WSP S          3.43             3.59
                   TOTAL       10,209                                  10.78
ILEAGNEW  A960126A 1AEF           19  *RS  S          5.58              .02
                               4,090  *RSF S          1.84             4.32
                               4,601  *WSP S          4.63             4.86
                   TOTAL        8,710                                  9.20
FCFA2024DA00       0000        4,543  *RSF S          1.00             4.80
                               3,324  *WSP S          1.58             3.51
                   TOTAL        7,867                                  8.31
OPEN5              0201        2,385  *RSF S          1.89             2.52
                                 322  *WSP S          1.00              .34
                   TOTAL        2,707                                  2.86
SEIZE LOCK RANGE   0000        1,093  *RSF S          1.00             1.15
                               1,191  *WSP S          1.08             1.26
                   TOTAL        2,284                                  2.41
TESTIO             0201        1,929  *RSF S          1.38             2.04

Object name                    I/O    I/O     Average            Percent of
and type                       count  type    pages transferred  all system
                                              per I/O            I/Os
TESTIO             0201          343  *WSP S          1.00              .36
                   TOTAL        2,272                                  2.40
QCAWAREA           19EF        1,264  *RSF S          1.00             1.34
                                 995  *WSP S          1.00             1.05
                   TOTAL        2,259                                  2.39
OPENBAD   A960126A 1AEF           23  *RS  S          6.83              .02
                               1,187  *RSF S          1.54             1.25
                                 893  *WSP S          1.79              .94
                   TOTAL        2,103                                  2.21
ILEAGN             0201        1,461  *RSF S          1.33             1.54
                                 272  *WSP S          1.00              .29
                   TOTAL        1,733                                  1.83
PF04      PF04     0B90          317  *RS  A          1.00              .33
                                 316  *RS  S          1.00              .33
                                 545  *RSF S          1.00              .58
                                 528  *WSP S          1.00              .56
                   TOTAL        1,706                                  1.80
PF03      PF03     0B90          322  *RS  A          1.00              .34
                                 317  *RS  S          1.00              .33
                                 522  *RSF S          1.00              .55
                                 514  *WSP S          1.00              .54
                   TOTAL        1,675                                  1.76
PF05      PF05     0B90          318  *RS  A          1.00              .34
                                 317  *RS  S          1.00              .33
                                 509  *RSF S          1.00              .54
                                 528  *WSP S          1.00              .56
```

Figure 84 (Part 1 of 4).

Object name and type			I/O count	I/O type	Average pages transferred per I/O	Percent of all system I/Os
		TOTAL	1,672			1.77
PF02	PF02	0B90	319	*RS A	1.00	.34
			318	*RS S	1.00	.34
			495	*RSF S	1.00	.52
			489	*WSP S	1.00	.52
		TOTAL	1,621			1.72
PF01	PF01	0B90	319	*RS A	1.00	.34
			319	*RS S	1.00	.34
			469	*RSF S	1.00	.50
			489	*WSP S	1.00	.52
		TOTAL	1,596			1.70
JUNK	QSPLJOB	1AEF	56	*RS S	7.86	.06
			690	*RSF S	1.74	.73
			12	*WS S	8.92	.01
			736	*WSP S	4.19	.78
		TOTAL	1,494			1.58
QRNXDUMP		0203	1,012	*RSF S	1.00	1.07
			417	*WSP S	1.00	.44
		TOTAL	1,429			1.51
C3E62C036004		0000	623	*RSF S	1.00	.66
			748	*WSP S	1.00	.79
		TOTAL	1,371			1.45
HATT		0401	1,246	*RSF S	1.00	1.32
		TOTAL	1,246			1.32
QWCBT01		19D0	3	*RS A	5.33	.00

Object name and type			I/O count	I/O type	Average pages transferred per I/O	Percent of all system I/Os
QWCBT01		19D0	3	*RS S	4.67	.00
			107	*RSF S	1.00	.11
			1,062	*RX A	7.88	1.12
		TOTAL	1,175			1.23
D2FB76C77200		0000	787	*RSF S	1.00	.83
			368	*WSP S	1.34	.39
		TOTAL	1,155			1.22
F5075E554004		0000	493	*RSF S	1.00	.52
			596	*WSP S	1.00	.63
		TOTAL	1,089			1.15
C2E7BB3D7004		0000	480	*RSF S	1.00	.51
			581	*WSP S	1.00	.61
		TOTAL	1,061			1.12
QJOBMSGQ		18A0	422	*RSF S	1.00	.45
			1	*WS S	1.00	.00
			627	*WSP S	1.52	.66
		TOTAL	1,050			1.11
FD3057655004		0000	490	*RSF S	1.00	.52
			540	*WSP S	1.00	.57
		TOTAL	1,030			1.09
D3334BC40004		0000	469	*RSF S	1.00	.50
			551	*WSP S	1.00	.58
		TOTAL	1,020			1.08
D7A7822472O0		0000	732	*RSF S	3.08	.77

Object name and type			I/O count	I/O type	Average pages transferred per I/O	Percent of all system I/Os
D7A7822472O0		0000	279	*WSP S	1.00	.29
		TOTAL	1,011			1.06
F3CA6CD12004		0000	457	*RSF S	1.00	.48
			515	*WSP S	1.00	.54
		TOTAL	972			1.02
F86D14F54004		0000	354	*RSF S	1.00	.37
			617	*WSP S	1.00	.65
		TOTAL	971			1.02
OPENBAD		0201	965	*RSF S	1.34	1.02
		TOTAL	965			1.02
TESTIOC		0201	871	*RSF S	1.49	.92
		TOTAL	871			.92
QSQENDAG		0201	840	*RSF S	1.33	.89
		TOTAL	840			.89
QLEAWI		0203	837	*RSF S	3.97	.88
		TOTAL	837			.88
QRNXIE		0203	296	*RSF S	1.00	.31
			336	*WSP S	1.00	.35
		TOTAL	632			.66
QWVPDAGE		0201	556	*RS S	1.00	.59
			25	*RSF S	1.00	.03

Figure 84 (Part 2 of 4).

```
Object name                    I/O    I/O     Average            Percent of
and type                       count  type    pages transferred  all system
                                              per I/O            I/Os
                  TOTAL          581                                     .62
ILEAGNEW          0201           567  *RSF S          1.50               .60
                  TOTAL          567                                     .60
D56C3B528F00      0000           280  *RSF S          1.00               .30
                                 281  *WSP S          1.00               .30
                  TOTAL          561                                     .60
QUIRCLAP          0201           556  *RS  S          1.00               .59
                  TOTAL          556                                     .59
QUSRSYS           0401           450  *RSF S          1.00               .48
                  TOTAL          450                                     .48
QDBGETM           0201           447  *RSF S          3.98               .47
                  TOTAL          447                                     .47
QDFTOWN           0801           404  *RSF S          1.00               .43
                  TOTAL          404                                     .43
DSPOBJD           1901           385  *RSF S          1.00               .41
                  TOTAL          385                                     .41
QSOSRV2           0203           371  *RSF S          2.98               .39
                                  13  *WSP S          1.00               .01
                  TOTAL          384                                     .40
PF01              1901           308  *RSF S          1.00               .33
                                                  M05


Object name                    I/O    I/O     Average            Percent of
and type                       count  type    pages transferred  all system
                                              per I/O            I/Os
                  TOTAL          308                                     .33
PF02              1901           308  *RSF S          1.00               .33
                  TOTAL          308                                     .33
PF05              1901           306  *RSF S          1.00               .32
                  TOTAL          306                                     .32
PF04              1901           305  *RSF S          1.00               .32
                  TOTAL          305                                     .32
PF03              1901           304  *RSF S          1.00               .32
                  TOTAL          304                                     .32
APLIST            19EF           281  *RSF S          1.00               .30
                  TOTAL          281                                     .30
QTMPLPRC          0201           266  *RSF S          2.83               .28
                                  14  *WSP S          1.00               .01
                  TOTAL          280                                     .29
QSOKERN3          0203           214  *RSF S          3.61               .23
                  TOTAL          214                                     .23
E7CB3ED3600 4     0000            90  *RSF S          1.00               .10
                                 106  *WSP S          1.00               .11
                  TOTAL          196                                     .21
L/L RANGE 1       0000           192  *RSF S          1.00               .20
```

Figure 84 (Part 3 of 4).

```
Object name                    I/O    I/O     Average            Percent of
and type                       count  type    pages transferred  all system
                                              per I/O            I/Os
                  TOTAL          192                                     .20
QSOSRV1           0203           143  *RSF S          1.78               .15
                                  13  *WSP S          1.00               .01
                  TOTAL          156                                     .16
SQCCSID1          0ED2           114  *RSF S          1.00               .12
                                  31  *WSP S          1.00               .03
                  TOTAL          145                                     .15
E43BF962E500      0000            81  *RSF S          1.00               .09
                                  55  *WSP S          1.76               .06
                  TOTAL          136                                     .15
QATOCTCPIPCONFIG  0C90            67  *RSF S          1.00               .07
                                  41  *WSP S          1.00               .04
                  TOTAL          108                                     .11
                  FINAL TOTALS
                  TOTAL       91,972                                   97.16
* * *  E N D  O F  R E P O R T  * * *
```

Figure 84 (Part 4 of 4).

10.2.7 Report Title - DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task Name and I/O Type

This report is produced from Command Option - By Object and Job/Task Name.

```
DASD I/Os for objects with 1% or more of all system I/Os by
Job/Task name and I/O type. Only includes Jobs/Tasks with 1% or
more of the object's I/Os.
       QUERY NAME . . . . . IOOBJT3
       LIBRARY NAME . . . . SMTRACE
       FILE         LIBRARY      MEMBER       FORMAT
       IOOBJT2      PFREXP2      PEXTRACE     IOOBJT2
       TASKINFO     PFREXP2      PEXTRACE     TASKINFO
       DATE . . . . . 08/02/96
       TIME . . . . . 18:52:16
```

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
DSPOBJD	DSPOBJD 0B90	00008810	TSTIOC	A960126A	053543	1,370	*RS A	8.69	1.00
						473	*RS S	3.00	1.00
						1,455	*RSF S	9.23	1.00
						11,969	*RX A	75.92	1.00
					TOTAL	15,267		96.84	
					TOTAL	15,267		96.84	
*DESTROYED	0000	00008814	OPENBAD	A960126A	053546	1,856	*RS S	18.18	1.00
						1,789	*RSF S	17.52	1.00
					TOTAL	3,645		35.70	
		0000880E	ILEAGNEW	A960126A	053541	2,063	*RSF S	20.21	1.00
					TOTAL	2,063		20.21	
		00008810	TSTIOC	A960126A	053543	745	*RS S	7.30	1.00
						99	*RSF S	.97	1.00
					TOTAL	844		8.27	
		0000006B	SMPO0006			532	*WSP S	5.21	3.65
					TOTAL	532		5.21	
		00000068	SMPO0003			509	*WSP S	4.99	3.47
					TOTAL	509		4.99	
		00000069	SMPO0004			493	*WSP S	4.83	3.38
					TOTAL	493		4.83	
		00000066	SMPO0001			485	*WSP S	4.75	3.27
					TOTAL	485		4.75	

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
*DESTROYED	0000	0000006A	SMPO0005			483	*WSP S	4.73	3.40
					TOTAL	483		4.73	
		00000067	SMPO0002			457	*WSP S	4.48	3.45
					TOTAL	457		4.48	
		0000006C	SMPO0007			441	*WSP S	4.32	3.37
					TOTAL	441		4.32	
		00008408	JUNK	QSPLJOB	053464	239	*RSF S	2.34	1.00
					TOTAL	239		2.34	
					TOTAL	10,191		99.83	
ILEAGNEW	A960126A 1AEF	0000880E	ILEAGNEW	A960126A	053541	18	*RS S	.21	5.44
						4,090	*RSF S	46.96	1.84
						9	*WSP S	.10	5.44
					TOTAL	4,117		47.27	
		00000069	SMPO0004			716	*WSP S	8.22	4.68
					TOTAL	716		8.22	
		0000006B	SMPO0006			673	*WSP S	7.73	4.76
					TOTAL	673		7.73	
		00000068	SMPO0003			665	*WSP S	7.63	4.67
					TOTAL	665		7.63	
		00000066	SMPO0001			650	*WSP S	7.46	4.48
					TOTAL	650		7.46	

Figure 85 (Part 1 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
ILEAGNEW A960126A	1AEF	00000067	SMPO0002			649	*WSP S	7.45	4.49
					TOTAL	649		7.45	
		0000006C	SMPO0007			626	*WSP S	7.19	4.55
					TOTAL	626		7.19	
		0000006A	SMPO0005			613	*WSP S	7.04	4.79
					TOTAL	613		7.04	
					TOTAL	8,709		99.99	
FCFA2O24DAO0	0000	0000880E	ILEAGNEW	A960126A	053541	4,543	*RSF S	57.75	1.00
					TOTAL	4,543		57.75	
		0000006B	SMPO0006			523	*WSP S	6.65	1.59
					TOTAL	523		6.65	
		00000067	SMPO0002			502	*WSP S	6.38	1.58
					TOTAL	502		6.38	
		00000066	SMPO0001			484	*WSP S	6.15	1.59
					TOTAL	484		6.15	
		00000068	SMPO0003			474	*WSP S	6.03	1.59
					TOTAL	474		6.03	
		0000006A	SMPO0005			469	*WSP S	5.96	1.57
					TOTAL	469		5.96	
		0000006C	SMPO0007			458	*WSP S	5.82	1.59

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Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
					TOTAL	458		5.82	
FCFA2O24DAO0	0000	00000069	SMPO0004			414	*WSP S	5.26	1.57
					TOTAL	414		5.26	
					TOTAL	7,867		100.00	
OPEN5	02O1	00008814	OPENBAD	A960126A	053546	2,385	*RSF S	88.10	1.89
					TOTAL	2,385		88.10	
		00000068	SMPO0003			54	*WSP S	1.99	1.00
					TOTAL	54		1.99	
		00000067	SMPO0002			49	*WSP S	1.81	1.00
					TOTAL	49		1.81	
		0000006B	SMPO0006			47	*WSP S	1.74	1.00
					TOTAL	47		1.74	
		0000006A	SMPO0005			46	*WSP S	1.70	1.00
					TOTAL	46		1.70	
		00000066	SMPO0001			46	*WSP S	1.70	1.00
					TOTAL	46		1.70	
		0000006C	SMPO0007			43	*WSP S	1.59	1.00
					TOTAL	43		1.59	
		00000069	SMPO0004			37	*WSP S	1.37	1.00
					TOTAL	37		1.37	

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Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
					TOTAL	2,707		100.00	
SEIZE LOCK RANGE	0000	00008814	OPENBAD	A960126A	053546	728	*RSF S	31.87	1.00
					TOTAL	728		31.87	
		0000880E	ILEAGNEW	A960126A	053541	272	*RSF S	11.91	1.00
					TOTAL	272		11.91	
		00000069	SMPO0004			207	*WSP S	9.06	1.06
					TOTAL	207		9.06	
		0000006B	SMPO0006			185	*WSP S	8.10	1.10
					TOTAL	185		8.10	
		00000067	SMPO0002			169	*WSP S	7.40	1.02
					TOTAL	169		7.40	
		00000068	SMPO0003			164	*WSP S	7.18	1.09
					TOTAL	164		7.18	
		0000006C	SMPO0007			162	*WSP S	7.09	1.12
					TOTAL	162		7.09	
		0000006A	SMPO0005			158	*WSP S	6.92	1.08
					TOTAL	158		6.92	
		00000066	SMPO0001			146	*WSP S	6.39	1.08
					TOTAL	146		6.39	
		00008408	JUNK	QSPLJOB	053464	60	*RSF S	2.63	1.00

Figure 85 (Part 2 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
					TOTAL	60		2.63	
SEIZE LOCK RANGE	0000	00008810	TSTIOC	A960126A	053543	25	*RSF S	1.09	1.00
					TOTAL	25		1.09	
					TOTAL	2,276		99.64	
TESTIO	0201	00008810	TSTIOC	A960126A	053543	1,929	*RSF S	84.90	1.38
					TOTAL	1,929		84.90	
		00000066	SMP00001			54	*WSP S	2.38	1.00
					TOTAL	54		2.38	
		00000067	SMP00002			54	*WSP S	2.38	1.00
					TOTAL	54		2.38	
		0000006B	SMP00006			52	*WSP S	2.29	1.00
					TOTAL	52		2.29	
		0000006A	SMP00005			49	*WSP S	2.16	1.00
					TOTAL	49		2.16	
		00000068	SMP00003			48	*WSP S	2.11	1.00
					TOTAL	48		2.11	
		0000006C	SMP00007			47	*WSP S	2.07	1.00
					TOTAL	47		2.07	
		00000069	SMP00004			39	*WSP S	1.72	1.00
					TOTAL	39		1.72	

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Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
					TOTAL	2,272		100.01	
QCAWAREA	19EF	00008814	OPENBAD	A960126A	053546	621	*RSF S	27.49	1.00
					TOTAL	621		27.49	
		00008810	TSTIOC	A960126A	053543	367	*RSF S	16.25	1.00
					TOTAL	367		16.25	
		0000880E	ILEAGNEW	A960126A	053541	276	*RSF S	12.22	1.00
					TOTAL	276		12.22	
		0000006B	SMP00006			157	*WSP S	6.95	1.00
					TOTAL	157		6.95	
		0000006C	SMP00007			152	*WSP S	6.73	1.00
					TOTAL	152		6.73	
		0000006A	SMP00005			146	*WSP S	6.46	1.00
					TOTAL	146		6.46	
		00000068	SMP00003			146	*WSP S	6.46	1.00
					TOTAL	146		6.46	
		00000066	SMP00001			141	*WSP S	6.24	1.00
					TOTAL	141		6.24	
		00000069	SMP00004			130	*WSP S	5.75	1.00
					TOTAL	130		5.75	
		00000067	SMP00002			123	*WSP S	5.44	1.00

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Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred	
					TOTAL	123		5.44		
					TOTAL	2,259		99.99		
OPENBAD	A960126A	1AEF	00008814	OPENBAD	A960126A	053546	23	*RS S	1.09	6.83
							1,187	*RSF S	56.44	1.54
							16	*WSP S	.76	9.75
						TOTAL	1,226		58.29	
			0000006C	SMP00007			139	*WSP S	6.61	1.65
						TOTAL	139		6.61	
			00000068	SMP00003			135	*WSP S	6.42	1.59
						TOTAL	135		6.42	
			0000006A	SMP00005			132	*WSP S	6.28	1.50
						TOTAL	132		6.28	
			00000069	SMP00004			127	*WSP S	6.04	1.70
						TOTAL	127		6.04	
			00000067	SMP00002			117	*WSP S	5.56	1.65
						TOTAL	117		5.56	
			0000006B	SMP00006			114	*WSP S	5.42	1.72
						TOTAL	114		5.42	
			00000066	SMP00001			113	*WSP S	5.37	1.74
						TOTAL	113		5.37	
						TOTAL	2,103		99.99	

Figure 85 (Part 3 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

Object name and type			TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
ILEAGN		0201	0000880E	ILEAGNEW	A960126A	053541	1,461	*RSF S	84.30	1.33
						TOTAL	1,461		84.30	
			00000066	SMP00001			50	*WSP S	2.89	1.00
						TOTAL	50		2.89	
			0000006B	SMP00006			41	*WSP S	2.37	1.00
						TOTAL	41		2.37	
			00000069	SMP00004			38	*WSP S	2.19	1.00
						TOTAL	38		2.19	
			00000067	SMP00002			37	*WSP S	2.14	1.00
						TOTAL	37		2.14	
			00000068	SMP00003			37	*WSP S	2.14	1.00
						TOTAL	37		2.14	
			0000006A	SMP00005			35	*WSP S	2.02	1.00
						TOTAL	35		2.02	
			0000006C	SMP00007			34	*WSP S	1.96	1.00
						TOTAL	34		1.96	
						TOTAL	1,733		100.01	
PF04	PF04	0B90	00008814	OPENBAD	A960126A	053546	317	*RS A	18.58	1.00
							316	*RS S	18.52	1.00
							545	*RSF S	31.95	1.00
						TOTAL	1,178		69.05	

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Object name and type			TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
PF04	PF04	0B90	0000006B	SMP00006			85	*WSP S	4.98	1.00
						TOTAL	85		4.98	
			0000006C	SMP00007			79	*WSP S	4.63	1.00
						TOTAL	79		4.63	
			00000068	SMP00003			79	*WSP S	4.63	1.00
						TOTAL	79		4.63	
			0000006A	SMP00005			76	*WSP S	4.45	1.00
						TOTAL	76		4.45	
			00000066	SMP00001			70	*WSP S	4.10	1.00
						TOTAL	70		4.10	
			00000067	SMP00002			70	*WSP S	4.10	1.00
						TOTAL	70		4.10	
			00000069	SMP00004			69	*WSP S	4.04	1.00
						TOTAL	69		4.04	
						TOTAL	1,706		99.98	
PF03	PF03	0B90	00008814	OPENBAD	A960126A	053546	322	*RS A	19.22	1.00
							317	*RS S	18.93	1.00
							522	*RSF S	31.16	1.00
						TOTAL	1,161		69.31	
			00000068	SMP00003			88	*WSP S	5.25	1.00
						TOTAL	88		5.25	

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Object name and type			TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
PF03	PF03	0B90	00000069	SMP00004			84	*WSP S	5.01	1.00
						TOTAL	84		5.01	
			00000067	SMP00002			80	*WSP S	4.78	1.00
						TOTAL	80		4.78	
			0000006B	SMP00006			79	*WSP S	4.72	1.00
						TOTAL	79		4.72	
			00000066	SMP00001			63	*WSP S	3.76	1.00
						TOTAL	63		3.76	
			0000006C	SMP00007			61	*WSP S	3.64	1.00
						TOTAL	61		3.64	
			0000006A	SMP00005			59	*WSP S	3.52	1.00
						TOTAL	59		3.52	
						TOTAL	1,675		99.99	
PF05	PF05	0B90	00008814	OPENBAD	A960126A	053546	318	*RS A	19.02	1.00
							317	*RS S	18.96	1.00
							509	*RSF S	30.44	1.00
						TOTAL	1,144		68.42	
			0000006B	SMP00006			92	*WSP S	5.50	1.00
						TOTAL	92		5.50	
			00000069	SMP00004			85	*WSP S	5.08	1.00
						TOTAL	85		5.08	

Figure 85 (Part 4 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

Object name and type			TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
PF05	PF05	0B90	00000066	SMP00001			79	*WSP S	4.72	1.00
						TOTAL	79		4.72	
			0000006A	SMP00005			69	*WSP S	4.13	1.00
						TOTAL	69		4.13	
			0000006C	SMP00007			69	*WSP S	4.13	1.00
						TOTAL	69		4.13	
			00000067	SMP00002			68	*WSP S	4.07	1.00
						TOTAL	68		4.07	
			00000068	SMP00003			66	*WSP S	3.95	1.00
						TOTAL	66		3.95	
						TOTAL	1,672		100.00	
PF02	PF02	0B90	00008814	OPENBAD	A960126A	053546	319	*RS A	19.68	1.00
							318	*RS S	19.62	1.00
							495	*RSF S	30.54	1.00
						TOTAL	1,132		69.84	
			00000067	SMP00002			80	*WSP S	4.94	1.00
						TOTAL	80		4.94	
			0000006B	SMP00006			77	*WSP S	4.75	1.00
						TOTAL	77		4.75	
			00000068	SMP00003			75	*WSP S	4.63	1.00
						TOTAL	75		4.63	

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Object name and type			TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
PF02	PF02	0B90	0000006C	SMP00007			68	*WSP S	4.19	1.00
						TOTAL	68		4.19	
			00000069	SMP00004			65	*WSP S	4.01	1.00
						TOTAL	65		4.01	
			00000066	SMP00001			63	*WSP S	3.89	1.00
						TOTAL	63		3.89	
			0000006A	SMP00005			61	*WSP S	3.76	1.00
						TOTAL	61		3.76	
						TOTAL	1,621		100.01	
PF01	PF01	0B90	00008814	OPENBAD	A960126A	053546	319	*RS A	19.99	1.00
							319	*RS S	19.99	1.00
							469	*RSF S	29.39	1.00
						TOTAL	1,107		69.37	
			00000068	SMP00003			83	*WSP S	5.20	1.00
						TOTAL	83		5.20	
			0000006B	SMP00006			81	*WSP S	5.08	1.00
						TOTAL	81		5.08	
			0000006C	SMP00007			71	*WSP S	4.45	1.00
						TOTAL	71		4.45	
			00000067	SMP00002			65	*WSP S	4.07	1.00
						TOTAL	65		4.07	

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Object name and type			TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
PF01	PF01	0B90	00000066	SMP00001			64	*WSP S	4.01	1.00
						TOTAL	64		4.01	
			0000006A	SMP00005			63	*WSP S	3.95	1.00
						TOTAL	63		3.95	
			00000069	SMP00004			62	*WSP S	3.88	1.00
						TOTAL	62		3.88	
						TOTAL	1,596		100.01	
JUNK	QSPLJOB	1AEF	00008408	JUNK	QSPLJOB	053464	56	*RS S	3.75	7.86
							690	*RSF S	46.18	1.74
							12	*WS S	.80	8.92
							6	*WSP S	.40	8.83
						TOTAL	764		51.13	
			0000006A	SMP00005			114	*WSP S	7.63	3.74
						TOTAL	114		7.63	
			00000067	SMP00002			110	*WSP S	7.36	4.51
						TOTAL	110		7.36	
			00000068	SMP00003			110	*WSP S	7.36	4.10
						TOTAL	110		7.36	
			00000066	SMP00001			108	*WSP S	7.23	3.68
						TOTAL	108		7.23	
			0000006C	SMP00007			103	*WSP S	6.89	4.84

Figure 85 (Part 5 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
					TOTAL	103		6.89	
JUNK	QSPLJOB 1AEF	00000069	SMP00004			102	*WSP S	6.83	3.74
					TOTAL	102		6.83	
		0000006B	SMP00006			83	*WSP S	5.56	4.63
					TOTAL	83		5.56	
					TOTAL	1,494		99.99	
QRNXDUMP	0203	0000880E	ILEAGNEW	A960126A	053541	1,012	*RSF S	70.82	1.00
					TOTAL	1,012		70.82	
		0000006C	SMP00007			68	*WSP S	4.76	1.00
					TOTAL	68		4.76	
		0000006A	SMP00005			64	*WSP S	4.48	1.00
					TOTAL	64		4.48	
		00000069	SMP00004			63	*WSP S	4.41	1.00
					TOTAL	63		4.41	
		00000068	SMP00003			59	*WSP S	4.13	1.00
					TOTAL	59		4.13	
		0000006B	SMP00006			58	*WSP S	4.06	1.00
					TOTAL	58		4.06	
		00000066	SMP00001			56	*WSP S	3.92	1.00
					TOTAL	56		3.92	

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Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
QRNXDUMP	0203	00000067	SMP00002			49	*WSP S	3.43	1.00
					TOTAL	49		3.43	
					TOTAL	1,429		100.01	
C3E62C036004	0000	0000880E	ILEAGNEW	A960126A	053541	623	*RSF S	45.44	1.00
					TOTAL	623		45.44	
		00000066	SMP00001			123	*WSP S	8.97	1.00
					TOTAL	123		8.97	
		0000006B	SMP00006			113	*WSP S	8.24	1.00
					TOTAL	113		8.24	
		00000069	SMP00004			111	*WSP S	8.10	1.00
					TOTAL	111		8.10	
		0000006A	SMP00005			109	*WSP S	7.95	1.00
					TOTAL	109		7.95	
		0000006C	SMP00007			98	*WSP S	7.15	1.00
					TOTAL	98		7.15	
		00000067	SMP00002			98	*WSP S	7.15	1.00
					TOTAL	98		7.15	
		00000068	SMP00003			96	*WSP S	7.00	1.00
					TOTAL	96		7.00	
					TOTAL	1,371		100.00	

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Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
HATT	0401	00008810	TSTIOC	A960126A	053543	1,246	*RSF S	100.00	1.00
					TOTAL	1,246		100.00	
					TOTAL	1,246		100.00	
QWCBT01	19D0	00007F6C	P23ARTVKE	A960126A	053319	3	*RS A	.26	5.33
						3	*RS S	.26	4.67
						99	*RSF S	8.43	1.00
						1,062	*RX A	90.38	7.88
					TOTAL	1,167		99.33	
					TOTAL	1,167		99.33	
D2FB76C7720O	0000	00008408	JUNK	QSPLJOB	053464	787	*RSF S	68.14	1.00
					TOTAL	787		68.14	
		00000068	SMP00003			77	*WSP S	6.67	1.38
					TOTAL	77		6.67	
		0000006C	SMP00007			69	*WSP S	5.97	1.38
					TOTAL	69		5.97	
		0000006A	SMP00005			60	*WSP S	5.19	1.38
					TOTAL	60		5.19	
		00000069	SMP00004			47	*WSP S	4.07	1.30
					TOTAL	47		4.07	
		0000006B	SMP00006			39	*WSP S	3.38	1.38
					TOTAL	39		3.38	

Figure 85 (Part 6 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
D2FB76C7720O	0000	00000066	SMPO0001			38	*WSP S	3.29	1.21
					TOTAL	38		3.29	
		00000067	SMPO0002			38	*WSP S	3.29	1.29
					TOTAL	38		3.29	
					TOTAL	1,155		100.00	
F5O75E554OO4	0000	00008814	OPENBAD	A960126A	053546	493	*RSF S	45.27	1.00
					TOTAL	493		45.27	
		0000006A	SMPO0005			102	*WSP S	9.37	1.00
					TOTAL	102		9.37	
		0000006B	SMPO0006			100	*WSP S	9.18	1.00
					TOTAL	100		9.18	
		00000068	SMPO0003			85	*WSP S	7.81	1.00
					TOTAL	85		7.81	
		0000006C	SMPO0007			82	*WSP S	7.53	1.00
					TOTAL	82		7.53	
		00000067	SMPO0002			79	*WSP S	7.25	1.00
					TOTAL	79		7.25	
		00000069	SMPO0004			78	*WSP S	7.16	1.00
					TOTAL	78		7.16	
		00000066	SMPO0001			70	*WSP S	6.43	1.00
				M05					

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
					TOTAL	70		6.43	
					TOTAL	1,089		100.00	
C2E7BB3D7OO4	0000	00008814	OPENBAD	A960126A	053546	480	*RSF S	45.24	1.00
					TOTAL	480		45.24	
		00000067	SMPO0002			94	*WSP S	8.86	1.00
					TOTAL	94		8.86	
		00000066	SMPO0001			87	*WSP S	8.20	1.00
					TOTAL	87		8.20	
		00000068	SMPO0003			83	*WSP S	7.82	1.00
					TOTAL	83		7.82	
		0000006C	SMPO0007			82	*WSP S	7.73	1.00
					TOTAL	82		7.73	
		0000006A	SMPO0005			81	*WSP S	7.63	1.00
					TOTAL	81		7.63	
		00000069	SMPO0004			78	*WSP S	7.35	1.00
					TOTAL	78		7.35	
		0000006B	SMPO0006			76	*WSP S	7.16	1.00
					TOTAL	76		7.16	
					TOTAL	1,061		99.99	
QJOBMSGQ	18A0	0000880E	ILEAGNEW	A960126A	053541	274	*RSF S	26.10	1.00
				M05					

Object name and type		TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
QJOBMSGQ	18A0	0000880E	ILEAGNEW	A960126A	053541	1	*WS S	.10	1.00
					TOTAL	275		26.20	
		00008408	JUNK	QSPLJOB	053464	139	*RSF S	13.24	1.00
					TOTAL	139		13.24	
		00000067	SMPO0002			107	*WSP S	10.19	1.51
					TOTAL	107		10.19	
		00000069	SMPO0004			94	*WSP S	8.95	1.53
					TOTAL	94		8.95	
		00000068	SMPO0003			90	*WSP S	8.57	1.53
					TOTAL	90		8.57	
		0000006C	SMPO0007			85	*WSP S	8.10	1.53
					TOTAL	85		8.10	
		0000006A	SMPO0005			84	*WSP S	8.00	1.49
					TOTAL	84		8.00	
		0000006B	SMPO0006			84	*WSP S	8.00	1.52
					TOTAL	84		8.00	
		00000066	SMPO0001			83	*WSP S	7.90	1.55
					TOTAL	83		7.90	
					TOTAL	1,041		99.15	
FD3057655OO4	0000	00008814	OPENBAD	A960126A	053546	490	*RSF S	47.57	1.00

Figure 85 (Part 7 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

Object name and type	TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
				TOTAL	490		47.57	
FD3057655004 0000	0000006B	SMP00006			87	*WSP S	8.45	1.00
				TOTAL	87		8.45	
	00000067	SMP00002			80	*WSP S	7.77	1.00
				TOTAL	80		7.77	
	00000068	SMP00003			80	*WSP S	7.77	1.00
				TOTAL	80		7.77	
	00000069	SMP00004			76	*WSP S	7.38	1.00
				TOTAL	76		7.38	
	00000066	SMP00001			73	*WSP S	7.09	1.00
				TOTAL	73		7.09	
	0000006A	SMP00005			72	*WSP S	6.99	1.00
				TOTAL	72		6.99	
	0000006C	SMP00007			72	*WSP S	6.99	1.00
				TOTAL	72		6.99	
				TOTAL	1,030		100.01	
D3334BC40004 0000	00008814	OPENBAD	A960126A	053546	469	*RSF S	45.98	1.00
				TOTAL	469		45.98	
	00000069	SMP00004			88	*WSP S	8.63	1.00
				TOTAL	88		8.63	

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Object name and type	TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
D3334BC40004 0000	0000006B	SMP00006			83	*WSP S	8.14	1.00
				TOTAL	83		8.14	
	00000068	SMP00003			79	*WSP S	7.75	1.00
				TOTAL	79		7.75	
	0000006C	SMP00007			77	*WSP S	7.55	1.00
				TOTAL	77		7.55	
	00000066	SMP00001			77	*WSP S	7.55	1.00
				TOTAL	77		7.55	
	00000067	SMP00002			75	*WSP S	7.35	1.00
				TOTAL	75		7.35	
	0000006A	SMP00005			72	*WSP S	7.06	1.00
				TOTAL	72		7.06	
				TOTAL	1,020		100.01	
D7A782247200 0000	0000880E	ILEAGNEW	A960126A	053541	732	*RSF S	72.40	3.08
				TOTAL	732		72.40	
	0000006C	SMP00007			52	*WSP S	5.14	1.00
				TOTAL	52		5.14	
	00000069	SMP00004			41	*WSP S	4.06	1.00
				TOTAL	41		4.06	
	0000006A	SMP00005			40	*WSP S	3.96	1.00

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Object name and type	TDE number	Job/Task name	Job user	Job number	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
				TOTAL	40		3.96	
D7A782247200 0000	00000067	SMP00002			40	*WSP S	3.96	1.00
				TOTAL	40		3.96	
	00000068	SMP00003			38	*WSP S	3.76	1.00
				TOTAL	38		3.76	
	00000066	SMP00001			35	*WSP S	3.46	1.00
				TOTAL	35		3.46	
	0000006B	SMP00006			33	*WSP S	3.26	1.00
				TOTAL	33		3.26	
				TOTAL	1,011		100.00	
F3CA6CD12004 0000	00008814	OPENBAD	A960126A	053546	457	*RSF S	47.02	1.00
				TOTAL	457		47.02	
	0000006B	SMP00006			93	*WSP S	9.57	1.00
				TOTAL	93		9.57	
	00000067	SMP00002			82	*WSP S	8.44	1.00
				TOTAL	82		8.44	
	00000068	SMP00003			77	*WSP S	7.92	1.00
				TOTAL	77		7.92	
	00000069	SMP00004			69	*WSP S	7.10	1.00
				TOTAL	69		7.10	

Figure 85 (Part 8 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

```
Object name                TDE       Job/Task name     Job         Job             I/O    I/O     Percent this   Average pages
and type                   number                      user        number          count  type    object's I/Os  transferred
F3CA6CD12004         0000  0000006A  SMP00005                                        65  *WSP S          6.69         1.00
                                                                     TOTAL           65                  6.69
                           00000066  SMP00001                                        65  *WSP S          6.69         1.00
                                                                     TOTAL           65                  6.69
                           0000006C  SMP00007                                        64  *WSP S          6.58         1.00
                                                                     TOTAL           64                  6.58
                                                                     TOTAL          972                100.01
F86D14F54004         0000  00008810  TSTIOC            A960126A    053543          354  *RSF S         36.46         1.00
                                                                     TOTAL          354                 36.46
                           0000006C  SMP00007                                        99  *WSP S         10.20         1.00
                                                                     TOTAL           99                 10.20
                           0000006B  SMP00006                                        95  *WSP S          9.78         1.00
                                                                     TOTAL           95                  9.78
                           00000067  SMP00002                                        94  *WSP S          9.68         1.00
                                                                     TOTAL           94                  9.68
                           00000069  SMP00004                                        91  *WSP S          9.37         1.00
                                                                     TOTAL           91                  9.37
                           0000006A  SMP00005                                        86  *WSP S          8.86         1.00
                                                                     TOTAL           86                  8.86
                           00000066  SMP00001                                        81  *WSP S          8.34         1.00
                                                 M05

Object name                TDE       Job/Task name     Job         Job             I/O    I/O     Percent this   Average pages
and type                   number                      user        number          count  type    object's I/Os  transferred
                                                                     TOTAL           81                  8.34
F86D14F54004         0000  00000068  SMP00003                                        71  *WSP S          7.31         1.00
                                                                     TOTAL           71                  7.31
                                                                     TOTAL          971                100.00
OPENBAD              0201  00008814  OPENBAD           A960126A    053546          965  *RSF S        100.00         1.34
                                                                     TOTAL          965                100.00
                                                                     TOTAL          965                100.00
                                                                     FINAL TOTALS
                                                                     TOTAL       80,676              2,994.79
* * *  E N D  O F  R E P O R T  * * *
```

Figure 85 (Part 9 of 9). DASD I/Os for Objects with 1% or More of All System I/Os by Job/Task name and I/O Type

10.2.8 Report Title - DASD I/Os by Object Name/Type and Disk Unit Number

This report is produced from Command Option - By Object and Disk Unit.

```
                        DASD I/Os by object name/type and disk unit number
                        Includes only objects with 1% or more of all system I/Os.
                        Only I/Os with 1% or more of the unit's I/Os
                            QUERY NAME . . . . . IOOBJU2
                            LIBRARY NAME . . . . SMTRACE
                            FILE         LIBRARY      MEMBER       FORMAT
                            IOOBJU1B     PFREXP2      PEXTRACE     IOOBJU1B
                            IOOBJU1C     PFREXP2      PEXTRACE     IOOBJU1C
                            IOOBJU1      PFREXP2      PEXTRACE     IOOBJU1
                            DATE . . . . . 08/02/96
                            TIME . . . . . 18:52:46


Object name               Disk          I/O    I/O     Percent this   Average pages
and type                  unit          count  type    object's I/Os  transferred
DSPOBJD   DSPOBJD   0B90  008           1,370  *RS  A          8.69          1.00
                                          473  *RS  S          3.00          1.00
                                          464  *RSF S          2.94          1.00
                                       11,969  *RX  A         75.92          1.00
                          TOTAL        14,276                 90.55
                          001             991  *RSF S          6.29          1.00
                                          498  *WSP S          3.16          1.00
                          TOTAL         1,489                  9.45
                          TOTAL        15,765                100.00
*DESTROYED                0000  003           367  *RS  S          3.59          1.00
                                        1,366  *RSF S         13.38          1.00
                                            2  *WS  A           .02          1.00
                                            1  *WS  S           .01          1.00
                                          767  *WSP S          7.51          6.13
                          TOTAL         2,503                 24.51
                          008             367  *RS  S          3.59          1.00
                                        1,227  *RSF S         12.02          1.00
                                          824  *WSP S          8.07          5.13
                          TOTAL         2,418                 23.68
                          005             382  *RS  S          3.74          1.01
                                          748  *RSF S          7.33          1.00
                                        1,047  *WSP S         10.26          1.16
                          TOTAL         2,177                 21.33
                          004             373  *RS  S          3.65          1.00
                                          261  *RSF S          2.56          1.00
                                          193  *WSP S          1.89          2.25
                          TOTAL           827                  8.10

Object name               Disk          I/O    I/O     Percent this   Average pages
and type                  unit          count  type    object's I/Os  transferred
*DESTROYED                0000  006           371  *RS  S          3.63          1.00
                                          210  *RSF S          2.06          1.00
                                          186  *WSP S          1.82          1.92
                          TOTAL           767                  7.51
                          007             371  *RS  S          3.63          1.00
                                          211  *RSF S          2.07          1.00
                                          182  *WSP S          1.78          1.95
                          TOTAL           764                  7.48
                          001             371  *RS  S          3.63          1.00
                                          181  *RSF S          1.77          1.00
                                          201  *WSP S          1.97          1.89
                          TOTAL           753                  7.37
                          TOTAL        10,209                 99.98
ILEAGNEW  A960126A  1AEF  001              11  *RS  S           .13          6.18
                                        3,323  *RSF S         38.15          1.91
                                        2,127  *WSP S         24.42          4.75
                          TOTAL         5,461                 62.70
                          005               1  *RS  S           .01          6.00
                                          676  *RSF S          7.76          1.50
                                        2,146  *WSP S         24.64          4.38
                          TOTAL         2,823                 32.41
                          008               7  *RS  S           .08          4.57
                                           91  *RSF S          1.04          1.95
                                          328  *WSP S          3.77          5.53
                          TOTAL           426                  4.89
                          TOTAL         8,710                100.00
```

Figure 86 (Part 1 of 6). DASD I/Os by Object Name/Type and Disk Unit Number

Object name and type		Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
FCFA2024DA00	0000	003	861	*RSF S	10.94	1.00
			680	*WSP S	8.64	1.99
		TOTAL	1,541		19.58	
		008	1,151	*RSF S	14.63	1.00
			372	*WSP S	4.73	1.66
		TOTAL	1,523		19.36	
		004	745	*RSF S	9.47	1.00
			685	*WSP S	8.71	1.72
		TOTAL	1,430		18.18	
		001	822	*RSF S	10.45	1.00
			583	*WSP S	7.41	1.00
		TOTAL	1,405		17.86	
		005	646	*RSF S	8.21	1.00
			549	*WSP S	6.98	1.96
		TOTAL	1,195		15.19	
		007	318	*RSF S	4.04	1.00
			455	*WSP S	5.78	1.00
		TOTAL	773		9.82	
		TOTAL	7,867		99.99	
OPEN5	0201	007	1,459	*RSF S	53.90	2.24
		TOTAL	1,459		53.90	
		008	301	*RSF S	11.12	1.00
			322	*WSP S	11.90	1.00
				M05		

Object name and type		Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
		TOTAL	623		23.02	
OPEN5	0201	006	319	*RSF S	11.78	1.99
		TOTAL	319		11.78	
		005	306	*RSF S	11.30	1.00
		TOTAL	306		11.30	
		TOTAL	2,707		100.00	
SEIZE LOCK RANGE	0000	007	436	*RSF S	19.09	1.00
			491	*WSP S	21.50	1.05
		TOTAL	927		40.59	
		006	299	*RSF S	13.09	1.00
			301	*WSP S	13.18	1.03
		TOTAL	600		26.27	
		003	285	*RSF S	12.48	1.00
			305	*WSP S	13.35	1.07
		TOTAL	590		25.83	
		004	50	*RSF S	2.19	1.00
			60	*WSP S	2.63	1.45
		TOTAL	110		4.82	
		001	19	*RSF S	.83	1.00
			26	*WSP S	1.14	1.38
		TOTAL	45		1.97	
		TOTAL	2,272		99.48	

Figure 86 (Part 2 of 6). DASD I/Os by Object Name/Type and Disk Unit Number

Object name and type			Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
TESTIO		0201	008	1,006	*RSF S	44.28	1.73
			TOTAL	1,006		44.28	
			001	222	*RSF S	9.77	1.00
				343	*WSP S	15.10	1.00
			TOTAL	565		24.87	
			006	402	*RSF S	17.69	1.00
			TOTAL	402		17.69	
			007	299	*RSF S	13.16	1.00
			TOTAL	299		13.16	
			TOTAL	2,272		100.00	
QCAWAREA		19EF	003	692	*RSF S	30.63	1.00
				404	*WSP S	17.88	1.00
			TOTAL	1,096		48.51	
			008	296	*RSF S	13.10	1.00
				312	*WSP S	13.81	1.00
			TOTAL	608		26.91	
			004	276	*RSF S	12.22	1.00
				279	*WSP S	12.35	1.00
			TOTAL	555		24.57	
			TOTAL	2,259		99.99	
OPENBAD	A960126A	1AEF	004	15	*RS S	.71	6.60
				1,063	*RSF S	50.55	1.49
				755	*WSP S	35.90	1.82
					M05		

Object name and type			Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
			TOTAL	1,833		87.16	
OPENBAD	A960126A	1AEF	006	4	*RS S	.19	8.00
				124	*RSF S	5.90	2.00
				132	*WSP S	6.28	1.00
			TOTAL	260		12.37	
			TOTAL	2,093		99.53	
ILEAGN		0201	005	620	*RSF S	35.78	1.77
			TOTAL	620		35.78	
			006	284	*RSF S	16.39	1.00
				272	*WSP S	15.70	1.00
			TOTAL	556		32.09	
			001	279	*RSF S	16.10	1.00
			TOTAL	279		16.10	
			004	278	*RSF S	16.04	1.00
			TOTAL	278		16.04	
			TOTAL	1,733		100.01	
PF04	PF04	0B90	005	541	*RSF S	31.71	1.00
				528	*WSP S	30.95	1.00
			TOTAL	1,069		62.66	
			003	316	*RS S	18.52	1.00
				4	*RSF S	.23	1.00
			TOTAL	320		18.75	
					M05		

Object name and type			Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
PF04	PF04	0B90	006	317	*RS A	18.58	1.00
			TOTAL	317		18.58	
			TOTAL	1,706		99.99	
PF03	PF03	0B90	004	520	*RSF S	31.04	1.00
				514	*WSP S	30.69	1.00
			TOTAL	1,034		61.73	
			003	322	*RS A	19.22	1.00
				317	*RS S	18.93	1.00
				2	*RSF S	.12	1.00
			TOTAL	641		38.27	
			TOTAL	1,675		100.00	
PF05	PF05	0B90	001	500	*RSF S	29.90	1.00
				528	*WSP S	31.58	1.00
			TOTAL	1,028		61.48	
			005	318	*RS A	19.02	1.00
				317	*RS S	18.96	1.00
				9	*RSF S	.54	1.00
			TOTAL	644		38.52	
			TOTAL	1,672		100.00	
PF02	PF02	0B90	007	493	*RSF S	30.41	1.00
				489	*WSP S	30.17	1.00
			TOTAL	982		60.58	
			006	319	*RS A	19.68	1.00
				318	*RS S	19.62	1.00

Figure 86 (Part 3 of 6). DASD I/Os by Object Name/Type and Disk Unit Number

Object name and type			Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
PF02	PF02	0B90	006	2	*RSF S	.12	1.00
			TOTAL	639		39.42	
			TOTAL	1,621		100.00	
PF01	PF01	0B90	008	469	*RSF S	29.39	1.00
				489	*WSP S	30.64	1.00
			TOTAL	958		60.03	
			005	319	*RS A	19.99	1.00
				319	*RS S	19.99	1.00
			TOTAL	638		39.98	
			TOTAL	1,596		100.01	
JUNK	QSPLJOB	1AEF	005	17	*RS S	1.14	7.71
				492	*RSF S	32.93	1.72
				4	*WS S	.27	4.75
				278	*WSP S	18.61	3.45
			TOTAL	791		52.95	
			008	9	*RS S	.60	7.67
				64	*RSF S	4.28	1.56
				225	*WSP S	15.06	5.08
			TOTAL	298		19.94	
			003	21	*RS S	1.41	8.00
				76	*RSF S	5.09	2.00
				4	*WS S	.27	1.00
				158	*WSP S	10.58	4.77
			TOTAL	259		17.35	
			001	9	*RS S	.60	8.00
					M05		

Object name and type			Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
JUNK	QSPLJOB	1AEF	001	58	*RSF S	3.88	1.78
				73	*WSP S	4.89	2.62
			TOTAL	140		9.37	
			TOTAL	1,488		99.61	
QRNXDUMP		0203	003	1,012	*RSF S	70.82	1.00
				417	*WSP S	29.18	1.00
			TOTAL	1,429		100.00	
			TOTAL	1,429		100.00	
C3E62C036004		0000	001	291	*RSF S	21.23	1.00
				372	*WSP S	27.13	1.00
			TOTAL	663		48.36	
			007	166	*RSF S	12.11	1.00
				189	*WSP S	13.79	1.00
			TOTAL	355		25.90	
			005	156	*RSF S	11.38	1.00
				175	*WSP S	12.76	1.00
			TOTAL	331		24.14	
			004	10	*RSF S	.73	1.00
				12	*WSP S	.88	1.00
			TOTAL	22		1.61	
			TOTAL	1,371		100.01	
HATT		0401	001	1,246	*RSF S	100.00	1.00
			TOTAL	1,246		100.00	

Figure 86 (Part 4 of 6). DASD I/Os by Object Name/Type and Disk Unit Number

Object name and type		Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
		TOTAL	1,246		100.00	
QWCBT01	19D0	006	45	*RSF S	3.83	1.00
			318	*RX A	27.06	7.81
		TOTAL	363		30.89	
		005	3	*RS A	.26	5.33
			5	*RSF S	.43	1.00
			326	*RX A	27.74	7.98
		TOTAL	334		28.43	
		001	4	*RSF S	.34	1.00
			129	*RX A	10.98	7.92
		TOTAL	133		11.32	
		007	7	*RSF S	.60	1.00
			84	*RX A	7.15	7.87
		TOTAL	91		7.75	
		003	3	*RS S	.26	4.67
			11	*RSF S	.94	1.00
			74	*RX A	6.30	7.95
		TOTAL	88		7.50	
		008	9	*RSF S	.77	1.00
			75	*RX A	6.38	7.72
		TOTAL	84		7.15	
		004	26	*RSF S	2.21	1.00
			56	*RX A	4.77	7.70
		TOTAL	82		6.98	

Object name and type		Disk unit	I/O count	I/O type	Percent this object's I/Os	Average pages transferred
		TOTAL	1,175		100.02	
D2FB76C7720O	0000	004	166	*RSF S	14.37	1.00
			97	*WSP S	8.40	1.48
		TOTAL	263		22.77	
		008	188	*RSF S	16.28	1.00
			67	*WSP S	5.80	1.39
		TOTAL	255		22.08	
		006	130	*RSF S	11.26	1.00
			59	*WSP S	5.11	1.34
		TOTAL	189		16.37	
		007	106	*RSF S	9.18	1.00
			41	*WSP S	3.55	1.41
		TOTAL	147		12.73	
		005	99	*RSF S	8.57	1.00
			32	*WSP S	2.77	1.00
		TOTAL	131		11.34	
		003	52	*RSF S	4.50	1.00
			46	*WSP S	3.98	1.00
		TOTAL	98		8.48	
		001	46	*RSF S	3.98	1.00
			26	*WSP S	2.25	1.62
		TOTAL	72		6.23	
		TOTAL	1,155		100.00	

Figure 86 (Part 5 of 6). DASD I/Os by Object Name/Type and Disk Unit Number

```
Object name              Disk          I/O    I/O     Percent this   Average pages
and type                 unit          count  type    object's I/Os  transferred
F5075E554004       0000  004             493  *RSF S         45.27          1.00
                                         596  *WSP S         54.73          1.00
                         TOTAL         1,089                100.00
                         TOTAL         1,089                100.00
C2E7BB3D7004       0000  008             480  *RSF S         45.24          1.00
                                         581  *WSP S         54.76          1.00
                         TOTAL         1,061                100.00
                         TOTAL         1,061                100.00
QJOBMSGQ           18A0  008             276  *RSF S         26.29          1.00
                                           1  *WS  S           .10          1.00
                                         556  *WSP S         52.95          1.50
                         TOTAL           833                 79.34
                         005             114  *RSF S         10.86          1.00
                                          71  *WSP S          6.76          1.72
                         TOTAL           185                 17.62
                         004              25  *RSF S          2.38          1.00
                         TOTAL            25                  2.38
                         TOTAL         1,043                 99.34
FD3057655004       0000  008             490  *RSF S         47.57          1.00
                                         540  *WSP S         52.43          1.00
                         TOTAL         1,030                100.00
                         TOTAL         1,030                100.00
D3334BC40004       0000  003             469  *RSF S         45.98          1.00
                                                  M05


Object name              Disk          I/O    I/O     Percent this   Average pages
and type                 unit          count  type    object's I/Os  transferred
D3334BC40004       0000  003             551  *WSP S         54.02          1.00
                         TOTAL         1,020                100.00
                         TOTAL         1,020                100.00
D7A7822472O0       0000  001             732  *RSF S         72.40          3.08
                                         279  *WSP S         27.60          1.00
                         TOTAL         1,011                100.00
                         TOTAL         1,011                100.00
F3CA6CD12004       0000  007             457  *RSF S         47.02          1.00
                                         515  *WSP S         52.98          1.00
                         TOTAL           972                100.00
                         TOTAL           972                100.00
F86D14F54004       0000  008             354  *RSF S         36.46          1.00
                                         617  *WSP S         63.54          1.00
                         TOTAL           971                100.00
                         TOTAL           971                100.00
OPENBAD            0201  004             327  *RSF S         33.89          2.00
                         TOTAL           327                 33.89
                         005             314  *RSF S         32.54          1.00
                         TOTAL           314                 32.54
                         008             309  *RSF S         32.02          1.00
                         TOTAL           309                 32.02
                                                  M05


Object name              Disk          I/O    I/O     Percent this   Average pages
and type                 unit          count  type    object's I/Os  transferred
OPENBAD            0201  003              15  *RSF S          1.55          1.00
                         TOTAL            15                  1.55
                         TOTAL           965                100.00
                         FINAL TOTALS
                         TOTAL        81,183              2,997.96
* * *  E N D  O F  R E P O R T  * * *
```

Figure 86 (Part 6 of 6). DASD I/Os by Object Name/Type and Disk Unit Number

10.2.9 Report Title -Page Fault DASD Read I/Os by Job/Task Name and I/O Type

This report is produced from Command Option - Fault Reads by Job/Task.

```
Page fault DASD read I/Os by Job/Task name and I/O type
Includes only Jobs/Tasks that had 1% or more of all system
page fault DASD reads
    QUERY NAME . . . . . IFTDE3
    LIBRARY NAME . . . . SMTRACE
    FILE         LIBRARY      MEMBER       FORMAT
    IOTDE2       PFREXP2      $$FLT        IOTDE2
    IOTDE1       PFREXP2      $$FLT        IOTDE1
    TASKINFO     PFREXP2      PEXTRACE     TASKINFO
    IOTDE1A      PFREXP2      $$FLT        IOTDE1A
    DATE . . . . . 08/02/96
    TIME . . . . . 18:53:11


TDE       Job/Task          Job         Job     Fault DASD  Average      Percent of this   Percent of TOTAL
number    name              user        number  read count  pages        TDE's DASD fault  DASD fault reads
                                                           transferred  reads
0000880E  ILEAGNEW          A960126A    053541      18,500       1.46        100.00             40.08
00008814  OPENBAD           A960126A    053546      14,535       1.21        100.00             31.49
00008810  TSTIOC            A960126A    053543       7,724       1.32        100.00             16.73
00008408  JUNK              QSPLJOB     053464       4,995       1.72        100.00             10.82
* * *  E N D  O F  R E P O R T  * * *
```

Figure 87. Page Fault DASD Read I/Os by Job/Task Name and I/O Type

10.2.10 Report Title - Page Fault DASD Read I/Os by Job/Task and Object Name/Type

This report is produced from Command Option - Fault Reads by Job/Task, Object.

```
Page fault DASD read I/Os by Job/Task and Object Name/Type
Only includes Jobs/Tasks that performed 1% or more of all fault I/Os
Only include objects that had 1% or more of each Job's/Task's fault I/Os
          QUERY NAME . . . . . IFTOBJ3
          LIBRARY NAME . . . . SMTRACE
          FILE         LIBRARY      MEMBER       FORMAT
          IOTOBJ2      PFREXP2      $$FLT        IOTOBJ2
          IOTOBJ2A     PFREXP2      $$FLT        IOTOBJ2A
          IOTOBJ1B     PFREXP2      $$FLT        IOTOBJ1B
          TASKINFO     PFREXP2      PEXTRACE     TASKINFO
          IOTOBJ1A     PFREXP2      $$FLT        IOTOBJ1A
          DATE . . . . . 08/02/96
          TIME . . . . . 18:53:21
```

TDE number (in hex)	Job/Task name	Job user	Job number	Fault DASD read count	Object name and type			Percent of this TDE's fault DASD reads	Percent of ALL system fault DASD reads
0000880E	ILEAGNEW	A960126A	053541	4,543	FCFA2024DA00		0000	24.56	9.84
				4,090	ILEAGNEW	A960126A	1AEF	22.11	8.86
				2,063	*DESTROYED		0000	11.15	4.47
				1,461	ILEAGN		0201	7.90	3.17
				1,012	QRNXDUMP		0203	5.47	2.19
				833	QSQENDAG		0201	4.50	1.80
				828	QLEAWI		0203	4.48	1.79
				732	D7A7822472O0		0000	3.96	1.59
				623	C3E62C036004		0000	3.37	1.35
				567	ILEAGNEW		0201	3.06	1.23
				281	APLIST		19EF	1.52	.61
				280	D56C3B528F00		0000	1.51	.61
				276	QCAWAREA		19EF	1.49	.60
				274	QJOBMSGQ		18A0	1.48	.59
				272	SEIZE LOCK RANGE		0000	1.47	.59
			TOTAL	18,135				98.03	39.29
00008814	OPENBAD	A960126A	053546	2,385	OPEN5		0201	16.41	5.17
				1,789	*DESTROYED		0000	12.31	3.88
				1,187	OPENBAD	A960126A	1AEF	8.17	2.57
			M05						

TDE number (in hex)	Job/Task name	Job user	Job number	Fault DASD read count	Object name and type			Percent of this TDE's fault DASD reads	Percent of ALL system fault DASD reads
00008814	OPENBAD	A960126A	053546	965	OPENBAD		0201	6.64	2.09
				728	SEIZE LOCK RANGE		0000	5.01	1.58
				621	QCAWAREA		19EF	4.27	1.35
				545	PF04	PF04	0B90	3.75	1.18
				522	PF03	PF03	0B90	3.59	1.13
				509	PF05	PF05	0B90	3.50	1.10
				495	PF02	PF02	0B90	3.41	1.07
				493	F5075E554004		0000	3.39	1.07
				490	FD3057655004		0000	3.37	1.06
				480	C2E7BB3D7004		0000	3.30	1.04
				469	D3334BC40004		0000	3.23	1.02
				469	PF01	PF01	0B90	3.23	1.02
				457	F3CA6CD12004		0000	3.14	.99
				308	PF01		1901	2.12	.67
				308	PF02		1901	2.12	.67
				306	PF05		1901	2.11	.66
				305	PF04		1901	2.10	.66
				304	PF03		1901	2.09	.66
				265	QUSRSYS		0401	1.82	.57

Figure 88 (Part 1 of 2). Page Fault DASD Read I/Os by Job/Task and Object Name/Type

```
TDE number  Job/Task name     Job         Job       Fault DASD  Object name              Percent of this   Percent of ALL
(in hex)                     user        number    read count  and type                 TDE's fault DASD  system fault
                                                                                        reads             DASD reads
                                          TOTAL        14,400                                  99.08           31.21
 00008810   TSTIOC           A960126A    053543        1,929  TESTIO              0201        24.97            4.18
                                                      1,455  DSPOBJD   DSPOBJD   0B90        18.84            3.15
                                                      1,246  HATT                0401        16.13            2.70
                                                        871  TESTIOC             0201        11.28            1.89
                                                        447  QDBGETM             0201         5.79             .97
                                                        404  QDFTOWN             0801         5.23             .88
                                                        385  DSPOBJD             1901         4.98             .83
                                                        367  QCAWAREA            19EF         4.75             .80
                                                        354  F86D14F54004        0000         4.58             .77
                                                        112  QRNXIE              0203         1.45             .24
                                                         99  *DESTROYED          0000         1.28             .21
                                          TOTAL        7,669                                   99.28           16.62
 00008408   JUNK             QSPLJOB     053464          787  D2FB76C77200        0000        15.76            1.70
                                                        690  JUNK      QSPLJOB   1AEF        13.81            1.49
                                                        371  QSOSRV2             0203         7.43             .80
                                                        266  QTMPLPRC            0201         5.33             .58
                                                        239  *DESTROYED          0000         4.78             .52
                                                        214  QSOKERN3            0203         4.28             .46
                                  M05

TDE number  Job/Task name     Job         Job       Fault DASD  Object name              Percent of this   Percent of ALL
(in hex)                     user        number    read count  and type                 TDE's fault DASD  system fault
                                                                                        reads             DASD reads
 00008408   JUNK             QSPLJOB     053464          188  L/L RANGE 1         0000         3.76             .41
                                                        143  QSOSRV1             0203         2.86             .31
                                                        139  QJOBMSGQ            18A0         2.78             .30
                                                        110  SQCCSID1            0ED2         2.20             .24
                                                         90  E7CB3ED36004        0000         1.80             .19
                                                         84  CB409AF8A004        0000         1.68             .18
                                                         84  F4E3FAD8D004        0000         1.68             .18
                                                         81  QTQICONV            0203         1.62             .18
                                                         72  QC2UTIL1            0203         1.44             .16
                                                         72  QPOLLIB1            0203         1.44             .16
                                                         69  E43BF962E500        0000         1.38             .15
                                                         67  QATOCTCPIPCONFIG    0C90         1.34             .15
                                                         66  QYPPRT              0203         1.32             .14
                                                         61  EEE05252CB00        0000         1.22             .13
                                                         60  QSO_DNS_INDEX       0EEF         1.20             .13
                                                         60  SEIZE LOCK RANGE    0000         1.20             .13
                                                         52  QATOCTCPIPCONFIG    0B90         1.04             .11
                                                         50  F836A3DBEA00        0000         1.00             .11
                                                         50  QSPRMTDR            0201         1.00             .11
                                  M05

TDE number  Job/Task name     Job         Job       Fault DASD  Object name              Percent of this   Percent of ALL
(in hex)                     user        number    read count  and type                 TDE's fault DASD  system fault
                                                                                        reads             DASD reads
                                          TOTAL        4,165                                   83.35            9.02
                                          FINAL TOTALS
                                          TOTAL       44,369                                  379.74           96.14
* * *  E N D  O F  R E P O R T  * * *
```

Figure 88 (Part 2 of 2). Page Fault DASD Read I/Os by Job/Task and Object Name/Type

10.2.11 Report Title - Objects with 100 or More Page Fault DASD Read I/Os

This report is produced from Command Option - Objects with 100+ Fault Reads.

```
                                Objects with 100 or more page fault DASD read I/Os.
                                 QUERY NAME . . . . . IFOBJ2
                                 LIBRARY NAME . . . . SMTRACE
                                 FILE         LIBRARY      MEMBER       FORMAT
                                 IOOBJ1B      PFREXP2      $$FLT        IOOBJ1B
                                 IOOBJ1       PFREXP2      $$FLT        IOOBJ1
                                 IOOBJ1A      PFREXP2      $$FLT        IOOBJ1A
                                 DATE . . . . . 08/02/96
                                 TIME . . . . . 18:53:31

Object name                  Fault DASD  Average            Percent of
and type                     read count  pages transferred  all system
                                         per I/O            fault reads
FCFA2024DA00          0000         4,543          1.00             9.84
*DESTROYED            0000         4,204          1.00             9.11
ILEAGNEW  A960126A    1AEF         4,090          1.84             8.86
OPEN5                 0201         2,385          1.89             5.17
TESTIO                0201         1,929          1.38             4.18
ILEAGN                0201         1,461          1.33             3.17
DSPOBJD   DSPOBJD    0B90         1,455          1.00             3.15
QCAWAREA              19EF         1,264          1.00             2.74
HATT                  0401         1,246          1.00             2.70
OPENBAD   A960126A    1AEF         1,187          1.54             2.57
SEIZE LOCK RANGE      0000         1,093          1.00             2.37
QRNXDUMP              0203         1,012          1.00             2.19
OPENBAD               0201           965          1.34             2.09
TESTIOC               0201           871          1.49             1.89
QSQENDAG              0201           840          1.33             1.82
QLEAWI                0203           837          3.97             1.81
D2FB76C77200          0000           787          1.00             1.70
D7A782247200          0000           732          3.08             1.59
JUNK      QSPLJOB     1AEF           690          1.74             1.49
                                                  M05

Object name                  Fault DASD  Average            Percent of
and type                     read count  pages transferred  all system
                                         per I/O            fault reads
C3E62C036004          0000           623          1.00             1.35
ILEAGNEW              0201           567          1.50             1.23
PF04      PF04        0B90           545          1.00             1.18
PF03      PF03        0B90           522          1.00             1.13
PF05      PF05        0B90           509          1.00             1.10
PF02      PF02        0B90           495          1.00             1.07
F5075E554004          0000           493          1.00             1.07
FD3057655004          0000           490          1.00             1.06
C2E7BB3D7004          0000           480          1.00             1.04
D3334BC40004          0000           469          1.00             1.02
PF01      PF01        0B90           469          1.00             1.02
F3CA6CD12004          0000           457          1.00              .99
QUSRSYS               0401           450          1.00              .97
QDBGETM               0201           447          3.98              .97
QJOBMSGQ              18A0           422          1.00              .91
QDFTOWN               0801           404          1.00              .88
DSPOBJD               1901           385          1.00              .83
QSOSRV2               0203           371          2.98              .80
F86D14F54004          0000           354          1.00              .77
```

Figure 89 (Part 1 of 2). Objects with 100 or More Page Fault DASD Read I/Os

```
Object name                  Fault DASD  Average           Percent of
and type                     read count  pages transferred all system
                                         per I/O           fault reads
PF01                1901            308          1.00             .67
PF02                1901            308          1.00             .67
PF05                1901            306          1.00             .66
PF04                1901            305          1.00             .66
PF03                1901            304          1.00             .66
QRNXIE              0203            296          1.00             .64
APLIST              19EF            281          1.00             .61
D56C3B528F00        0000            280          1.00             .61
QTMPLPRC            0201            266          2.83             .58
QSOKERN3            0203            214          3.61             .46
L/L RANGE 1         0000            192          1.00             .42
QSOSRV1             0203            143          1.78             .31
SQCCSID1            0ED2            114          1.00             .25
QWCBT01             19D0            107          1.00             .23
                    FINAL TOTALS
                    TOTAL        43,967                          95.26
* * *  E N D  O F  R E P O R T  * * *
```

Figure 89 (Part 2 of 2). Objects with 100 or More Page Fault DASD Read I/Os

10.2.12 Report Title - Page Fault DASD Read I/Os for Objects with 1% or More of All Page Fault Reads

This report is produced from Command Option - Fault Reads by Object, Job/Task.

```
Page fault DASD read I/Os for objects with 1% or more of all page fault reads.
Job/Task name and I/O type. Only includes Jobs/Tasks with 1% or
more of the object's page fault reads.
                QUERY NAME . . . . . IFOBJT3
                LIBRARY NAME . . . . SMTRACE
                FILE         LIBRARY      MEMBER       FORMAT
                IOOBJT2      PFREXP2      $$FLT        IOOBJT2
                TASKINFO     PFREXP2      PEXTRACE     TASKINFO
                DATE . . . . . . . . 08/02/96
                TIME . . . . . . . . 18:53:42
```

Object name and type		TDE number	Job/Task name	Job user	Job number	Fault DASD read count	Percent this object's fault read I/Os	Average pages transferred
FCFA2O24DAOO	0000	0000880E	ILEAGNEW	A960126A	053541	4,543	100.00	1.00
					TOTAL	4,543	100.00	
*DESTROYED	0000	0000880E	ILEAGNEW	A960126A	053541	2,063	49.07	1.00
		00008814	OPENBAD	A960126A	053546	1,789	42.55	1.00
		00008408	JUNK	QSPLJOB	053464	239	5.69	1.00
		00008810	TSTIOC	A960126A	053543	99	2.35	1.00
					TOTAL	4,190	99.66	
ILEAGNEW A960126A	1AEF	0000880E	ILEAGNEW	A960126A	053541	4,090	100.00	1.84
					TOTAL	4,090	100.00	
OPEN5	0201	00008814	OPENBAD	A960126A	053546	2,385	100.00	1.89
					TOTAL	2,385	100.00	
TESTIO	0201	00008810	TSTIOC	A960126A	053543	1,929	100.00	1.38
					TOTAL	1,929	100.00	
ILEAGN	0201	0000880E	ILEAGNEW	A960126A	053541	1,461	100.00	1.33
					TOTAL	1,461	100.00	
DSPOBJD DSPOBJD	0B90	00008810	TSTIOC	A960126A	053543	1,455	100.00	1.00
					TOTAL	1,455	100.00	
QCAWAREA	19EF	00008814	OPENBAD	A960126A	053546	621	49.13	1.00
		00008810	TSTIOC	A960126A	053543	367	29.03	1.00

```
                                  MO5
```

Object name and type		TDE number	Job/Task name	Job user	Job number	Fault DASD read count	Percent this object's fault read I/Os	Average pages transferred
QCAWAREA	19EF	0000880E	ILEAGNEW	A960126A	053541	276	21.84	1.00
					TOTAL	1,264	100.00	
HATT	0401	00008810	TSTIOC	A960126A	053543	1,246	100.00	1.00
					TOTAL	1,246	100.00	
OPENBAD A960126A	1AEF	00008814	OPENBAD	A960126A	053546	1,187	100.00	1.54
					TOTAL	1,187	100.00	
SEIZE LOCK RANGE	0000	00008814	OPENBAD	A960126A	053546	728	66.61	1.00
		0000880E	ILEAGNEW	A960126A	053541	272	24.89	1.00
		00008408	JUNK	QSPLJOB	053464	60	5.49	1.00
		00008810	TSTIOC	A960126A	053543	25	2.29	1.00
					TOTAL	1,085	99.28	
QRNXDUMP	0203	0000880E	ILEAGNEW	A960126A	053541	1,012	100.00	1.00
					TOTAL	1,012	100.00	
OPENBAD	0201	00008814	OPENBAD	A960126A	053546	965	100.00	1.34
					TOTAL	965	100.00	
TESTIOC	0201	00008810	TSTIOC	A960126A	053543	871	100.00	1.49
					TOTAL	871	100.00	
QSQENDAG	0201	0000880E	ILEAGNEW	A960126A	053541	833	99.17	1.33
					TOTAL	833	99.17	

Figure 90 (Part 1 of 2). Page Fault DASD Read I/Os for Objects with 1% or More of All Page Fault Reads

Object name and type		TDE number	Job/Task name	Job user	Job number	Fault DASD read count	Percent this object's fault read I/Os	Average pages transferred	
QLEAWI		0203	0000880E	ILEAGNEW	A960126A	053541	828	98.92	3.97
			00008408	JUNK	QSPLJOB	053464	9	1.08	4.00
						TOTAL	837	100.00	
D2FB76C77200		0000	00008408	JUNK	QSPLJOB	053464	787	100.00	1.00
						TOTAL	787	100.00	
D7A782247200		0000	0000880E	ILEAGNEW	A960126A	053541	732	100.00	3.08
						TOTAL	732	100.00	
JUNK	QSPLJOB	1AEF	00008408	JUNK	QSPLJOB	053464	690	100.00	1.74
						TOTAL	690	100.00	
C3E62C036004		0000	0000880E	ILEAGNEW	A960126A	053541	623	100.00	1.00
						TOTAL	623	100.00	
ILEAGNEW		0201	0000880E	ILEAGNEW	A960126A	053541	567	100.00	1.50
						TOTAL	567	100.00	
PF04	PF04	0B90	00008814	OPENBAD	A960126A	053546	545	100.00	1.00
						TOTAL	545	100.00	
PF03	PF03	0B90	00008814	OPENBAD	A960126A	053546	522	100.00	1.00
						TOTAL	522	100.00	
PF05	PF05	0B90	00008814	OPENBAD	A960126A	053546	509	100.00	1.00
						TOTAL	509	100.00	

Object name and type		TDE number	Job/Task name	Job user	Job number	Fault DASD read count	Percent this object's fault read I/Os	Average pages transferred	
PF02	PF02	0B90	00008814	OPENBAD	A960126A	053546	495	100.00	1.00
						TOTAL	495	100.00	
F5075E554004		0000	00008814	OPENBAD	A960126A	053546	493	100.00	1.00
						TOTAL	493	100.00	
FD3057655004		0000	00008814	OPENBAD	A960126A	053546	490	100.00	1.00
						TOTAL	490	100.00	
C2E7BB3D7004		0000	00008814	OPENBAD	A960126A	053546	480	100.00	1.00
						TOTAL	480	100.00	
D3334BC40004		0000	00008814	OPENBAD	A960126A	053546	469	100.00	1.00
						TOTAL	469	100.00	
PF01	PF01	0B90	00008814	OPENBAD	A960126A	053546	469	100.00	1.00
						TOTAL	469	100.00	
						FINAL TOTALS			
						TOTAL	37,224	2,998.11	

* * * E N D O F R E P O R T * * *

Figure 90 (Part 2 of 2). Page Fault DASD Read I/Os for Objects with 1% or More of All Page Fault Reads

10.2.13 Report Title - Physical I/Os by Disk Unit (Arm) Number

This report is produced from Command Option - By Unit (Arm).

```
                Physical I/Os by disk unit (arm) number
QUERY NAME . . . . . IOUNIT4
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
IOUNIT3      PFREXP2      PEXTRACE     IOUNIT3
IOUNIT1      PFREXP2      PEXTRACE     IOUNIT1
IOUNIT2      PFREXP2      PEXTRACE     IOUNIT2
DATE . . . . . 08/02/96
TIME . . . . . 18:54:04
```

```
                                                  M05

UNIT  I/O         I/O    Percent of all  Average bytes
      type        count  system I/Os     transferred
008   *RS  A      1,370        1.45             4,096
      *RS  S      1,437        1.52             4,355
      *RSF S      8,315        8.78             4,643
      *RX  A     12,044       12.72             4,267
      *WS  A          6         .01             4,096
      *WS  S          4         .00             6,144
      *WSP A          5         .01             4,096
      *WSP S      5,381        5.69             8,989
                 28,562       30.18             5,263
001   *RS  S        396         .42             5,379
      *RSF S     10,339       10.92             6,088
      *RX  A        129         .14            32,450
      *WS  A          4         .00             4,096
      *WS  S         42         .04             5,071
      *WSP A          5         .01             4,096
      *WSP S      5,517        5.83            10,283
                 16,432       17.36             7,683
005   *RS  A        640         .68             4,179
      *RS  S      1,041        1.10             4,674
      *RSF S      6,147        6.49             5,321
                                                  M05

UNIT  I/O         I/O    Percent of all  Average bytes
      type        count  system I/Os     transferred
005   *RX  A        326         .34            32,705
      *WS  S         40         .04             8,499
      *WSP S      4,900        5.18            11,422
                 13,094       13.83             8,189
003   *RS  A        322         .34             4,096
      *RS  S      1,313        1.39             4,608
      *RSF S      6,054        6.40             4,844
      *RX  A         74         .08            32,547
      *WS  A          3         .00             4,096
      *WS  S          9         .01             4,096
      *WSP A          1         .00             4,096
      *WSP S      3,395        3.59            10,403
                 11,171       11.80             6,667
004   *RS  S        443         .47             5,233
      *RSF S      6,309        6.67             5,617
      *RX  A         56         .06            31,525
      *WS  S          1         .00             4,096
      *WSP S      3,591        3.79             5,725
                 10,400       10.99             5,777
007   *RS  A         12         .01             4,096
```

Figure 91 (Part 1 of 2). Physical I/Os by Disk Unit (arm) Number

```
UNIT  I/O         I/O    Percent of all  Average bytes
      type        count  system I/Os     transferred
007   *RS  S        420         .44             4,233
      *RSF S      5,510        5.82             7,429
      *RX  A         84         .09            32,232
      *WS  A          1         .00             4,096
      *WS  S          3         .00            12,288
      *WSP A          1         .00             4,096
      *WSP S      2,446        2.58             4,454
                  8,477        8.96             6,654
006   *RS  A        636         .67             4,096
      *RS  S        986        1.04             4,295
      *RSF S      3,487        3.68             6,189
      *RX  A        318         .34            32,008
      *WS  A          4         .00             4,096
      *WS  S         12         .01            31,744
      *WSP A          1         .00             4,096
      *WSP S      1,071        1.13             5,106
                  6,515        6.88             6,826
* * *  E N D  O F  R E P O R T  * * *
```

Figure 91 (Part 2 of 2). Physical I/Os by Disk Unit (arm) Number

10.2.14 Report Title - Physical Disk I/Os by Unit (Arm) and Job

This report is produced from Command Option - By Unit (Arm) and Job/Task.

```
                                  Physical disk I/Os by unit (arm) and Job/Task
                                QUERY NAME . . . . . UNITT7
                                LIBRARY NAME . . . . SMTRACE
                                FILE         LIBRARY      MEMBER       FORMAT
                                UNITT4       PFREXP2      PEXTRACE     UNITT4
                                UNITT6       PFREXP2      PEXTRACE     UNITT6
                                UNITT1       PFREXP2      PEXTRACE     UNITT1
                                UNITT2       PFREXP2      PEXTRACE     UNITT2
                                TASKINFO     PFREXP2      PEXTRACE     TASKINFO
                                DATE . . . . . 08/02/96
                                TIME . . . . . 18:54:35

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Disk unit  TDE number  Job/Task name     Job user    Job number  I/O type  I/O count  Percent of ALL  Percent of this  Average bytes
(arm)      (in hex)                                                                    system I/Os     arm's I/Os       transferred
(in hex)
   008      00008810   TSTIOC           A960126A      053543     *RS  A      1,370        1.45            4.80            4,096
                                                                 *RS  S        595         .63            2.08            4,096
                                                                 *RSF S      1,997        2.11            6.99            5,612
                                                                 *RX  A     11,969       12.65           41.91            4,096
                                                                           15,931       16.83           55.78            4,286
            0000880E   ILEAGNEW         A960126A      053541     *RS  S        560         .59            1.96            4,279
                                                                 *RSF S      2,733        2.89            9.57            4,225
                                                                 *WS  S          2         .00             .01            6,144
                                                                 *WSP S          6         .01             .02           13,653
                                                                           3,301        3.49           11.56            4,252
            00008814   OPENBAD          A960126A      053546     *RS  S        246         .26             .86            4,096
                                                                 *RSF S      2,696        2.85            9.44            4,098
                                                                           2,942        3.11           10.30            4,097
            00008408   JUNK             QSPLJOB       053464     *RS  S         26         .03             .09           13,548
                                                                 *RSF S        803         .85            2.81            5,478
                                                                             829         .88            2.90            5,731
            0000006B   SMP00006                                  *WSP S        795         .84            2.78            8,908
                                                                             795         .84            2.78            8,908
                                                 M05

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Disk unit  TDE number  Job/Task name     Job user    Job number  I/O type  I/O count  Percent of ALL  Percent of this  Average bytes
(arm)      (in hex)                                                                    system I/Os     arm's I/Os       transferred
(in hex)
   008      00000068   SMP00003                                  *WSP S        783         .83            2.74            9,175
                                                                             783         .83            2.74            9,175
            00000066   SMP00001                                  *WSP S        775         .82            2.71            9,027
                                                                             775         .82            2.71            9,027
            00000067   SMP00002                                  *WSP S        774         .82            2.71            8,811
                                                                             774         .82            2.71            8,811
            0000006C   SMP00007                                  *WSP S        766         .81            2.68            9,240
                                                                             766         .81            2.68            9,240
            0000006A   SMP00005                                  *WSP S        732         .77            2.56            9,238
                                                                             732         .77            2.56            9,238
            00000069   SMP00004                                  *WSP S        729         .77            2.55            8,613
                                                                             729         .77            2.55            8,613
   001      0000880E   ILEAGNEW         A960126A      053541     *RS  S         10         .01             .06           24,576
                                                                 *RSF S      6,291        6.65           38.29            7,228
                                                                 *WSP S          4         .00             .02           32,768
                                                                           6,305        6.66           38.37            7,271
            00008810   TSTIOC           A960126A      053543     *RS  S        108         .11             .66            4,096
                                                                 *RSF S      2,476        2.62           15.07            4,096
```

Figure 92 (Part 1 of 5). Physical Disk I/Os by Unit (Arm) and Job

```
08/02/96  18:54:35                                                                                                    PAGE    3
Disk unit  TDE number  Job/Task name     Job user    Job number  I/O type  I/O count  Percent of ALL  Percent of this  Average bytes
(arm)      (in hex)                                                                    system I/Os     arm's I/Os       transferred
(in hex)
   001      00008810   TSTIOC           A960126A      053543                2,584        2.73           15.73            4,096
            00008814   OPENBAD          A960126A      053546     *RS  S        263         .28            1.60            4,096
                                                               *RSF S        692         .73            4.21            4,096
                                                                             955        1.01            5.81            4,096
            00008408   JUNK             QSPLJOB       053464     *RS  S          9         .01             .05           32,768
                                                               *RSF S        825         .87            5.02            5,139
                                                                             834         .88            5.08            5,437
            00000069   SMPO0004                                    *WSP S        816         .86            4.97           10,682
                                                                             816         .86            4.97           10,682
            0000006B   SMPO0006                                    *WSP S        813         .86            4.95           10,550
                                                                             813         .86            4.95           10,550
            00000066   SMPO0001                                    *WSP S        802         .85            4.88            9,811
                                                                             802         .85            4.88            9,811
            00000068   SMPO0003                                    *WSP S        794         .84            4.83           10,013
                                                                             794         .84            4.83           10,013
            0000006A   SMPO0005                                    *WSP S        777         .82            4.73           10,543
                                                                             777         .82            4.73           10,543
            00000067   SMPO0002                                    *WSP S        776         .82            4.72           10,277
                                                 M05

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Disk unit  TDE number  Job/Task name     Job user    Job number  I/O type  I/O count  Percent of ALL  Percent of this  Average bytes
(arm)      (in hex)                                                                    system I/Os     arm's I/Os       transferred
(in hex)
   001      00000067   SMPO0002                                                    776         .82            4.72           10,277
            0000006C   SMPO0007                                    *WSP S        734         .78            4.47            9,967
                                                                             734         .78            4.47            9,967
   005      00008814   OPENBAD          A960126A      053546     *RS  A        637         .67            4.86            4,096
                                                               *RS  S        914         .97            6.98            4,217
                                                               *RSF S      2,169        2.29           16.56            4,096
                                                               *WSP S          6         .01             .05           65,536
                                                                           3,726        3.94           28.46            4,225
            0000880E   ILEAGNEW         A960126A      053541     *RS  S          1         .00             .01           24,576
                                                               *RSF S      2,535        2.68           19.36            5,418
                                                                           2,536        2.68           19.37            5,425
            00008408   JUNK             QSPLJOB       053464     *RS  S         17         .02             .13           31,563
                                                               *RSF S        957        1.01            7.31            6,570
                                                               *WS  S          4         .00             .03           19,456
                                                               *WSP S          2         .00             .02           18,432
                                                                             980        1.04            7.48            7,080
            00000068   SMPO0003                                    *WSP S        730         .77            5.58           11,469
                                                                             730         .77            5.58           11,469
                                                 M05

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Disk unit  TDE number  Job/Task name     Job user    Job number  I/O type  I/O count  Percent of ALL  Percent of this  Average bytes
(arm)      (in hex)                                                                    system I/Os     arm's I/Os       transferred
(in hex)
   005      0000006B   SMPO0006                                    *WSP S        725         .77            5.54           11,593
                                                                             725         .77            5.54           11,593
            00000069   SMPO0004                                    *WSP S        712         .75            5.44           11,759
                                                                             712         .75            5.44           11,759
            0000006C   SMPO0007                                    *WSP S        705         .74            5.38           11,295
                                                                             705         .74            5.38           11,295
            00000066   SMPO0001                                    *WSP S        684         .72            5.22           11,168
                                                                             684         .72            5.22           11,168
            0000006A   SMPO0005                                    *WSP S        679         .72            5.19           11,094
                                                                             679         .72            5.19           11,094
            00000067   SMPO0002                                    *WSP S        657         .69            5.02           11,041
                                                                             657         .69            5.02           11,041
            00008810   TSTIOC           A960126A      053543     *RS  S        108         .11             .82            4,096
                                                               *RSF S        442         .47            3.38            8,053
                                                                             550         .58            4.20            7,276
            00007F6C   P23ARTVKE        A960126A      053319     *RS  A          3         .00             .02           21,845
                                                               *RSF S         21         .02             .16            4,291
                                                               *RX  A        326         .34            2.49           32,705
```

Figure 92 (Part 2 of 5). Physical Disk I/Os by Unit (Arm) and Job

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Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
005	00007F6C	P23ARTVKE	A960126A	053319	*WS S	4	.00	.03	4,096
						354	.37	2.70	30,604
003	0000880E	ILEAGNEW	A960126A	053541	*RS S	275	.29	2.46	4,096
					*RSF S	3,506	3.70	31.38	4,096
						3,781	3.99	33.85	4,096
	00008814	OPENBAD	A960126A	053546	*RS A	322	.34	2.88	4,096
					*RS S	890	.94	7.97	4,096
					*RSF S	1,475	1.56	13.20	4,096
						2,687	2.84	24.05	4,096
	00008408	JUNK	QSPLJOB	053464	*RS S	30	.03	.27	24,986
					*RSF S	770	.81	6.89	9,953
					*WS S	4	.00	.04	4,096
					*WSP S	2	.00	.02	4,096
						806	.85	7.22	10,469
	0000006B	SMP00006			*WSP S	520	.55	4.65	11,169
						520	.55	4.65	11,169
	00000068	SMP00003			*WSP S	507	.54	4.54	10,898
						507	.54	4.54	10,898
				M05					

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Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
003	00000069	SMP00004			*WSP S	503	.53	4.50	10,545
						503	.53	4.50	10,545
	0000006A	SMP00005			*WSP S	474	.50	4.24	9,981
						474	.50	4.24	9,981
	0000006C	SMP00007			*WSP S	473	.50	4.23	9,534
						473	.50	4.23	9,534
	00000067	SMP00002			*WSP S	470	.50	4.21	10,894
						470	.50	4.21	10,894
	00000066	SMP00001			*WSP S	445	.47	3.98	9,683
						445	.47	3.98	9,683
	00008810	TSTIOC	A960126A	053543	*RS S	110	.12	.98	4,096
					*RSF S	255	.27	2.28	4,096
						365	.39	3.27	4,096
004	00008814	OPENBAD	A960126A	053546	*RS S	280	.30	2.69	5,325
					*RSF S	2,968	3.14	28.54	5,266
					*WSP S	6	.01	.06	38,229
						3,254	3.44	31.29	5,332
	0000880E	ILEAGNEW	A960126A	053541	*RS S	4	.00	.04	4,096
				M05					

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Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
004	0000880E	ILEAGNEW	A960126A	053541	*RSF S	1,516	1.60	14.58	4,101
						1,520	1.61	14.62	4,101
	00008810	TSTIOC	A960126A	053543	*RS S	110	.12	1.06	4,096
					*RSF S	1,406	1.49	13.52	7,976
						1,516	1.60	14.58	7,695
	0000006B	SMP00006			*WSP S	550	.58	5.29	5,697
						550	.58	5.29	5,697
	00000068	SMP00003			*WSP S	517	.55	4.97	5,585
						517	.55	4.97	5,585
	0000006A	SMP00005			*WSP S	513	.54	4.93	5,461
						513	.54	4.93	5,461
	00000069	SMP00004			*WSP S	513	.54	4.93	5,765
						513	.54	4.93	5,765
	0000006C	SMP00007			*WSP S	508	.54	4.88	5,749
						508	.54	4.88	5,749
	00000067	SMP00002			*WSP S	494	.52	4.75	5,671
						494	.52	4.75	5,671
	00000066	SMP00001			*WSP S	481	.51	4.63	5,799

Figure 92 (Part 3 of 5). Physical Disk I/Os by Unit (Arm) and Job

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Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
004	00000066	SMPO0001				481	.51	4.63	5,799
	00008408	JUNK	QSPLJOB	053464	*RS S	38	.04	.37	8,300
					*RSF S	369	.39	3.55	5,817
						407	.43	3.91	6,048
007	00008814	OPENBAD	A960126A	053546	*RS S	280	.30	3.30	4,096
					*RSF S	2,987	3.16	35.24	6,574
						3,267	3.45	38.54	6,362
	0000880E	ILEAGNEW	A960126A	053541	*RSF S	1,320	1.39	15.57	11,720
						1,320	1.39	15.57	11,720
	00008810	TSTIOC	A960126A	053543	*RS S	91	.10	1.07	4,096
					*RSF S	724	.76	8.54	4,096
						815	.86	9.61	4,096
	00008408	JUNK	QSPLJOB	053464	*RS A	12	.01	.14	4,096
					*RS S	41	.04	.48	4,096
					*RSF S	434	.46	5.12	6,116
						487	.51	5.74	5,896
	0000006B	SMPO0006			*WSP S	376	.40	4.44	4,466
						376	.40	4.44	4,466

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Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
007	00000067	SMPO0002			*WSP S	370	.39	4.36	4,517
						370	.39	4.36	4,517
	00000068	SMPO0003			*WSP S	363	.38	4.28	4,389
						363	.38	4.28	4,389
	0000006A	SMPO0005			*WSP S	340	.36	4.01	4,482
						340	.36	4.01	4,482
	00000069	SMPO0004			*WSP S	338	.36	3.99	4,375
						338	.36	3.99	4,375
	00000066	SMPO0001			*WSP S	335	.35	3.95	4,536
						335	.35	3.95	4,536
	0000006C	SMPO0007			*WSP S	324	.34	3.82	4,412
						324	.34	3.82	4,412
	00007F6C	P23ARTVKE	A960126A	053319	*RS S	2	.00	.02	4,096
					*RSF S	28	.03	.33	4,096
					*RX A	84	.09	.99	32,232
					*WS A	1	.00	.01	4,096
						115	.12	1.36	24,647
006	00008814	OPENBAD	A960126A	053546	*RS A	636	.67	9.76	4,096

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Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
006	00008814	OPENBAD	A960126A	053546	*RS S	597	.63	9.16	4,302
					*RSF S	1,548	1.64	23.76	5,260
					*WSP S	4	.00	.06	4,096
						2,785	2.94	42.75	4,787
	0000880E	ILEAGNEW	A960126A	053541	*RS S	277	.29	4.25	4,155
					*RSF S	599	.63	9.19	6,017
						876	.93	13.45	5,429
	00008408	JUNK	QSPLJOB	053464	*RS S	9	.01	.14	9,557
					*RSF S	837	.88	12.85	9,259
					*WS S	4	.00	.06	86,016
					*WSP S	2	.00	.03	86,016
						852	.90	13.08	9,803
	00008810	TSTIOC	A960126A	053543	*RS S	96	.10	1.47	4,096
					*RSF S	424	.45	6.51	4,096
						520	.55	7.98	4,096
	00007F6C	P23ARTVKE	A960126A	053319	*RS S	3	.00	.05	4,096
					*RSF S	54	.06	.83	4,248
					*RX A	318	.34	4.88	32,008

Figure 92 (Part 4 of 5). Physical Disk I/Os by Unit (Arm) and Job

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Disk unit (arm) (in hex)	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average bytes transferred
006	00007F6C	P23ARTVKE	A960126A	053319		375	.40	5.76	27,787
	00000068	SMP00003			*WSP S	159	.17	2.44	5,049
						159	.17	2.44	5,049
	00000067	SMP00002			*WSP S	157	.17	2.41	4,957
						157	.17	2.41	4,957
	00000069	SMP00004			*WSP S	157	.17	2.41	4,957
						157	.17	2.41	4,957
	0000006B	SMP00006			*WSP S	153	.16	2.35	5,087
						153	.16	2.35	5,087
	0000006A	SMP00005			*WSP S	148	.16	2.27	4,843
						148	.16	2.27	4,843
	00000066	SMP00001			*WSP S	148	.16	2.27	4,816
						148	.16	2.27	4,816
	0000006C	SMP00007			*WSP S	141	.15	2.16	4,997
						141	.15	2.16	4,997

* * * E N D O F R E P O R T * * *

Figure 92 (Part 5 of 5). Physical Disk I/Os by Unit (Arm) and Job

10.2.15 Report Title - Physical Disk I/Os by Unit (Arm) and Object

This report is produced from Command Option - By Unit (Arm) and Object.

```
Physical disk I/Os by unit (arm) and object
Only includes objects which had 1+% of all system I/Os or
1+% of an arm's I/Os
    QUERY NAME . . . . . UNITO7
    LIBRARY NAME . . . . SMTRACE
    FILE         LIBRARY      MEMBER       FORMAT
    UNITO4       PFREXP2      PEXTRACE     UNITO4
    UNITO6       PFREXP2      PEXTRACE     UNITO6
    UNITO1       PFREXP2      PEXTRACE     UNITO1
    UNITO2       PFREXP2      PEXTRACE     UNITO2
    DATE . . . . . 08/02/96
    TIME . . . . . 18:55:08
```

Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
008	DSPOBJD	DSPOBJD	0B90	*RS A	1,370	1.45	4.80	4,096
				*RS S	473	.50	1.66	4,096
				*RSF S	464	.49	1.62	4,096
				*RX A	11,969	12.65	41.91	4,096
					14,276	15.08	49.98	4,096
	*DESTROYED		0000	*RS S	367	.39	1.28	4,096
				*RSF S	1,227	1.30	4.30	4,096
				*WSP S	824	.87	2.88	21,007
					2,418	2.55	8.47	9,859
	FCFA2024DA00		0000	*RSF S	1,151	1.22	4.03	4,096
				*WSP S	372	.39	1.30	6,783
					1,523	1.61	5.33	4,752
	C2E7BB3D7004		0000	*RSF S	480	.51	1.68	4,096
				*WSP S	581	.61	2.03	4,096
					1,061	1.12	3.71	4,096
	FD3057655004		0000	*RSF S	490	.52	1.72	4,096
				*WSP S	540	.57	1.89	4,096
					1,030	1.09	3.61	4,096
	TESTIO		0201	*RSF S	1,006	1.06	3.52	7,101
					MO5			

Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
008	TESTIO		0201		1,006	1.06	3.52	7,101
	F86D14F54004		0000	*RSF S	354	.37	1.24	4,096
				*WSP S	617	.65	2.16	4,096
					971	1.03	3.40	4,096
	PF01	PF01	0B90	*RSF S	469	.50	1.64	4,096
				*WSP S	489	.52	1.71	4,096
					958	1.01	3.35	4,096
	QJOBMSGQ		18A0	*RSF S	276	.29	.97	4,096
				*WS S	1	.00	.00	4,096
				*WSP S	556	.59	1.95	6,144
					833	.88	2.92	5,463
	OPEN5		0201	*RSF S	301	.32	1.05	4,096
				*WSP S	322	.34	1.13	4,096
					623	.66	2.18	4,096
	QCAWAREA		19EF	*RSF S	296	.31	1.04	4,096
				*WSP S	312	.33	1.09	4,096
					608	.64	2.13	4,096
	QUIRCLAP		0201	*RS S	556	.59	1.95	4,096
					556	.59	1.95	4,096

Figure 93 (Part 1 of 6). Physical Disk I/Os by Unit (Arm) and Object

Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
008	ILEAGNEW	A960126A	1AEF	*RS S	7	.01	.02	18,725
				*RSF S	91	.10	.32	7,967
				*WSP S	328	.35	1.15	22,640
					426	.45	1.49	19,442
	OPENBAD		0201	*RSF S	309	.33	1.08	4,096
					309	.33	1.08	4,096
	PF04		1901	*RSF S	305	.32	1.07	4,096
					305	.32	1.07	4,096
	JUNK	QSPLJOB	1AEF	*RS S	9	.01	.03	31,403
				*RSF S	64	.07	.22	6,400
				*WSP S	225	.24	.79	20,789
					298	.31	1.04	18,020
001	ILEAGNEW	A960126A	1AEF	*RS S	11	.01	.07	25,321
				*RSF S	3,323	3.51	20.22	7,814
				*WSP S	2,127	2.25	12.94	19,475
					5,461	5.77	33.23	12,391
	DSPOBJD	DSPOBJD	0B90	*RSF S	991	1.05	6.03	4,096
				*WSP S	498	.53	3.03	4,096
					1,489	1.57	9.06	4,096
					M05			

Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
001	FCFA2024DA00		0000	*RSF S	822	.87	5.00	4,096
				*WSP S	583	.62	3.55	4,096
					1,405	1.48	8.55	4,096
	HATT		0401	*RSF S	1,246	1.32	7.58	4,096
					1,246	1.32	7.58	4,096
	PF05	PF05	0B90	*RSF S	500	.53	3.04	4,096
				*WSP S	528	.56	3.21	4,096
					1,028	1.09	6.26	4,096
	D7A7822472O0		0000	*RSF S	732	.77	4.45	12,596
				*WSP S	279	.29	1.70	4,096
					1,011	1.07	6.15	10,250
	*DESTROYED		0000	*RS S	371	.39	2.26	4,096
				*RSF S	181	.19	1.10	4,096
				*WSP S	201	.21	1.22	7,723
					753	.80	4.58	5,064
	C3E62C036O04		0000	*RSF S	291	.31	1.77	4,096
				*WSP S	372	.39	2.26	4,096
					663	.70	4.03	4,096
	TESTIO		0201	*RSF S	222	.23	1.35	4,096
					M05			

Disk Unit (arm) (in hex)	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
001	TESTIO		0201	*WSP S	343	.36	2.09	4,096
					565	.60	3.44	4,096
	D56C3B528F00		0000	*RSF S	280	.30	1.70	4,096
				*WSP S	281	.30	1.71	4,096
					561	.59	3.41	4,096
	APLIST		19EF	*RSF S	281	.30	1.71	4,096
					281	.30	1.71	4,096
	QSQENDAG		0201	*RSF S	281	.30	1.71	8,134
					281	.30	1.71	8,134
	ILEAGN		0201	*RSF S	279	.29	1.70	4,096
					279	.29	1.70	4,096
	L/L RANGE 1		0000	*RSF S	192	.20	1.17	4,096
					192	.20	1.17	4,096
005	ILEAGNEW	A960126A	1AEF	*RS S	1	.00	.01	24,576
				*RSF S	676	.71	5.16	6,144
				*WSP S	2,146	2.27	16.39	17,928
					2,823	2.98	21.56	15,109
	*DESTROYED		0000	*RS S	382	.40	2.92	4,150
				*RSF S	748	.79	5.71	4,096

Figure 93 (Part 2 of 6). Physical Disk I/Os by Unit (Arm) and Object

Disk Unit (arm) (in hex)	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
005	*DESTROYED	0000	*WSP S	1,047	1.11	8.00	4,749
				2,177	2.30	16.63	4,420
	FCFA2024DA00	0000	*RSF S	646	.68	4.93	4,096
			*WSP S	549	.58	4.19	8,020
				1,195	1.26	9.13	5,899
	PF04 PF04	0B90	*RSF S	541	.57	4.13	4,096
			*WSP S	528	.56	4.03	4,096
				1,069	1.13	8.16	4,096
	JUNK QSPLJOB	1AEF	*RS S	17	.02	.13	31,563
			*RSF S	492	.52	3.76	7,035
			*WS S	4	.00	.03	19,456
			*WSP S	278	.29	2.12	14,130
				791	.84	6.04	10,118
	PF05 PF05	0B90	*RS A	318	.34	2.43	4,096
			*RS S	317	.33	2.42	4,096
			*RSF S	9	.01	.07	4,096
				644	.68	4.92	4,096
	PF01 PF01	0B90	*RS A	319	.34	2.44	4,096
			*RS S	319	.34	2.44	4,096
				M05			

Disk Unit (arm) (in hex)	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
005	PF01 PF01	0B90		638	.67	4.87	4,096
	ILEAGN	0201	*RSF S	620	.66	4.73	7,267
				620	.66	4.73	7,267
	TESTIOC	0201	*RSF S	429	.45	3.28	8,173
				429	.45	3.28	8,173
	QUSRSYS	0401	*RSF S	420	.44	3.21	4,096
				420	.44	3.21	4,096
	QWCBT01	19D0	*RS A	3	.00	.02	21,845
			*RSF S	5	.01	.04	4,096
			*RX A	326	.34	2.49	32,705
				334	.35	2.55	32,179
	C3E62C036004	0000	*RSF S	156	.16	1.19	4,096
			*WSP S	175	.18	1.34	4,096
				331	.35	2.53	4,096
	OPENBAD	0201	*RSF S	314	.33	2.40	4,096
				314	.33	2.40	4,096
	OPEN5	0201	*RSF S	306	.32	2.34	4,096
				306	.32	2.34	4,096
	ILEAGNEW	0201	*RSF S	280	.30	2.14	4,096
				M05			

Disk Unit (arm) (in hex)	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
005	ILEAGNEW	0201		280	.30	2.14	4,096
	QJOBMSGQ	18A0	*RSF S	114	.12	.87	4,096
			*WSP S	71	.08	.54	7,038
				185	.20	1.41	5,225
	D2FB76C77200	0000	*RSF S	99	.10	.76	4,096
			*WSP S	32	.03	.24	4,096
				131	.14	1.00	4,096
003	*DESTROYED	0000	*RS S	367	.39	3.29	4,096
			*RSF S	1,366	1.44	12.23	4,096
			*WS A	2	.00	.02	4,096
			*WS S	1	.00	.01	4,096
			*WSP S	767	.81	6.87	25,121
				2,503	2.64	22.41	10,539
	FCFA2024DA00	0000	*RSF S	861	.91	7.71	4,096
			*WSP S	680	.72	6.09	8,156
				1,541	1.63	13.79	5,888
	QRNXDUMP	0203	*RSF S	1,012	1.07	9.06	4,096
			*WSP S	417	.44	3.73	4,096
				1,429	1.51	12.79	4,096

Figure 93 (Part 3 of 6). Physical Disk I/Os by Unit (Arm) and Object

Disk Unit (arm) (in hex)	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
003	QCAWAREA	19EF	*RSF S	692	.73	6.19	4,096
			*WSP S	404	.43	3.62	4,096
				1,096	1.16	9.81	4,096
	D3334BC40004	0000	*RSF S	469	.50	4.20	4,096
			*WSP S	551	.58	4.93	4,096
				1,020	1.08	9.13	4,096
	PF03 PF03	0B90	*RS A	322	.34	2.88	4,096
			*RS S	317	.33	2.84	4,096
			*RSF S	2	.00	.02	4,096
				641	.68	5.74	4,096
	SEIZE LOCK RANGE	0000	*RSF S	285	.30	2.55	4,096
			*WSP S	305	.32	2.73	4,391
				590	.62	5.28	4,249
	PF04 PF04	0B90	*RS S	316	.33	2.83	4,096
			*RSF S	4	.00	.04	4,096
				320	.34	2.86	4,096
	PF01	1901	*RSF S	308	.33	2.76	4,096
				308	.33	2.76	4,096
	QSQENDAG	0201	*RSF S	279	.29	2.50	4,096
				M05			

Disk Unit (arm) (in hex)	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
003	QSQENDAG	0201		279	.29	2.50	4,096
	QWVPDAGE	0201	*RS S	278	.29	2.49	4,096
				278	.29	2.49	4,096
	JUNK QSPLJOB	1AEF	*RS S	21	.02	.19	32,768
			*RSF S	76	.08	.68	8,192
			*WS S	4	.00	.04	4,096
			*WSP S	158	.17	1.41	19,521
				259	.27	2.32	17,032
	QSOKERN3	0203	*RSF S	156	.16	1.40	14,704
				156	.16	1.40	14,704
	QSOSRV2	0203	*RSF S	140	.15	1.25	14,746
				140	.15	1.25	14,746
004	OPENBAD A960126A	1AEF	*RS S	15	.02	.14	27,034
			*RSF S	1,063	1.12	10.22	6,100
			*WSP S	755	.80	7.26	7,449
				1,833	1.94	17.63	6,827
	FCFA2024DA00	0000	*RSF S	745	.79	7.16	4,096
			*WSP S	685	.72	6.59	7,050
				1,430	1.51	13.75	5,511
				M05			

Disk Unit (arm) (in hex)	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
004	F5075E554004	0000	*RSF S	493	.52	4.74	4,096
			*WSP S	596	.63	5.73	4,096
				1,089	1.15	10.47	4,096
	PF03 PF03	0B90	*RSF S	520	.55	5.00	4,096
			*WSP S	514	.54	4.94	4,096
				1,034	1.09	9.94	4,096
	*DESTROYED	0000	*RS S	373	.39	3.59	4,096
			*RSF S	261	.28	2.51	4,096
			*WSP S	193	.20	1.86	9,232
				827	.87	7.95	5,295
	QRNXIE	0203	*RSF S	296	.31	2.85	4,096
			*WSP S	336	.35	3.23	4,096
				632	.67	6.08	4,096
	QCAWAREA	19EF	*RSF S	276	.29	2.65	4,096
			*WSP S	279	.29	2.68	4,096
				555	.59	5.34	4,096
	QDBGETM	0201	*RSF S	447	.47	4.30	16,292
				447	.47	4.30	16,292
	TESTIOC	0201	*RSF S	435	.46	4.18	4,096

Figure 93 (Part 4 of 6). Physical Disk I/Os by Unit (Arm) and Object

Disk Unit (arm) (in hex)	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
004	TESTIOC	0201		435	.46	4.18	4,096
	DSPOBJD	1901	*RSF S	385	.41	3.70	4,096
				385	.41	3.70	4,096
	OPENBAD	0201	*RSF S	327	.35	3.14	8,192
				327	.35	3.14	8,192
	PFO5	1901	*RSF S	306	.32	2.94	4,096
				306	.32	2.94	4,096
	ILEAGN	0201	*RSF S	278	.29	2.67	4,096
				278	.29	2.67	4,096
	D2FB76C7720O	0000	*RSF S	166	.18	1.60	4,096
			*WSP S	97	.10	.93	6,081
				263	.28	2.53	4,828
	SEIZE LOCK RANGE	0000	*RSF S	50	.05	.48	4,096
			*WSP S	60	.06	.58	5,939
				110	.12	1.06	5,101
007	OPEN5	0201	*RSF S	1,459	1.54	17.21	9,169
				1,459	1.54	17.21	9,169
	PFO2 PFO2	0B90	*RSF S	493	.52	5.82	4,096
			*WSP S	489	.52	5.77	4,096
				M05			

Disk Unit (arm) (in hex)	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
007	PFO2 PFO2	0B90		982	1.04	11.58	4,096
	F3CA6CD12OO4	0000	*RSF S	457	.48	5.39	4,096
			*WSP S	515	.54	6.08	4,096
				972	1.03	11.47	4,096
	SEIZE LOCK RANGE	0000	*RSF S	436	.46	5.14	4,096
			*WSP S	491	.52	5.79	4,305
				927	.98	10.94	4,206
	QLEAWI	0203	*RSF S	837	.88	9.87	16,252
				837	.88	9.87	16,252
	FCFA2O24DAOO	0000	*RSF S	318	.34	3.75	4,096
			*WSP S	455	.48	5.37	4,096
				773	.82	9.12	4,096
	*DESTROYED	0000	*RS S	371	.39	4.38	4,096
			*RSF S	211	.22	2.49	4,096
			*WSP S	182	.19	2.15	7,967
				764	.81	9.01	5,018
	QDFTOWN	0801	*RSF S	404	.43	4.77	4,096
				404	.43	4.77	4,096
	C3E62CO36OO4	0000	*RSF S	166	.18	1.96	4,096
				M05			

Disk Unit (arm) (in hex)	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this arm's I/Os	Average types transferred
007	C3E62CO36OO4	0000	*WSP S	189	.20	2.23	4,096
				355	.38	4.19	4,096
	TESTIO	0201	*RSF S	299	.32	3.53	4,096
				299	.32	3.53	4,096
	D2FB76C7720O	0000	*RSF S	106	.11	1.25	4,096
			*WSP S	41	.04	.48	5,794
				147	.16	1.73	4,570
	QWCBTO1	19D0	*RSF S	7	.01	.08	4,096
			*RX A	84	.09	.99	32,232
				91	.10	1.07	30,067
006	*DESTROYED	0000	*RS S	371	.39	5.69	4,096
			*RSF S	210	.22	3.22	4,096
			*WSP S	186	.20	2.85	7,862
				767	.81	11.77	5,009
	PFO2 PFO2	0B90	*RS A	319	.34	4.90	4,096
			*RS S	318	.34	4.88	4,096
			*RSF S	2	.00	.03	4,096
				639	.68	9.81	4,096
	SEIZE LOCK RANGE	0000	*RSF S	299	.32	4.59	4,096

Figure 93 (Part 5 of 6). Physical Disk I/Os by Unit (Arm) and Object

```
Disk Unit  Object name               I/O type  I/O count  Percent of ALL  Percent of this  Average types
(arm)      and type/subtype                               system I/Os     arm's I/Os       transferred
(in hex)
   006     SEIZE LOCK RANGE     0000   *WSP S         301         .32             4.62            4,205
                                                      600         .63             9.21            4,151
           ILEAGN               0201   *RSF S         284         .30             4.36            4,096
                                       *WSP S         272         .29             4.17            4,096
                                                      556         .59             8.53            4,096
           TESTIO               0201   *RSF S         402         .42             6.17            4,096
                                                      402         .42             6.17            4,096
           QWCBTO1              19D0   *RSF S          45         .05              .69            4,096
                                       *RX  A         318         .34             4.88           32,008
                                                      363         .38             5.57           28,548
           OPEN5                0201   *RSF S         319         .34             4.90            8,153
                                                      319         .34             4.90            8,153
           PFO4       PFO4      0B90   *RS  A         317         .33             4.87            4,096
                                                      317         .33             4.87            4,096
           PFO2                 1901   *RSF S         308         .33             4.73            4,096
                                                      308         .33             4.73            4,096
           PFO3                 1901   *RSF S         304         .32             4.67            4,096
                                                      304         .32             4.67            4,096
           QWVPDAGE             0201   *RS  S         278         .29             4.27            4,096
                                                    MO5

Disk Unit  Object name               I/O type  I/O count  Percent of ALL  Percent of this  Average types
(arm)      and type/subtype                               system I/Os     arm's I/Os       transferred
(in hex)
   006     QWVPDAGE             0201   *RSF S          25         .03              .38            4,096
                                                      303         .32             4.65            4,096
           ILEAGNEW             0201   *RSF S         281         .30             4.31            8,192
                                                      281         .30             4.31            8,192
           OPENBAD   A960126A   1AEF   *RS  S           4         .00              .06           32,768
                                       *RSF S         124         .13             1.90            8,192
                                       *WSP S         132         .14             2.03            4,096
                                                      260         .27             3.99            6,491
           D2FB76C772OO         0000   *RSF S         130         .14             2.00            4,096
                                       *WSP S          59         .06              .91            5,484
                                                      189         .20             2.90            4,529
           QTMPLPRC             0201   *RSF S         188         .20             2.89           14,053
                                                      188         .20             2.89           14,053
           QSOSRV2              0203   *RSF S         164         .17             2.52           13,012
                                                      164         .17             2.52           13,012
           QSOSRV1              0203   *RSF S         119         .13             1.83            7,951
                                       *WSP S          13         .01              .20            4,096
                                                      132         .14             2.03            7,571
           E7CB3ED36OO4         0000   *RSF S          44         .05              .68            4,096
                                                    MO5

Disk Unit  Object name               I/O type  I/O count  Percent of ALL  Percent of this  Average types
(arm)      and type/subtype                               system I/Os     arm's I/Os       transferred
(in hex)
   006     E7CB3ED36OO4         0000   *WSP S          53         .06              .81            4,096
                                                       97         .10             1.49            4,096
* * *  E N D  O F  R E P O R T  * * *
```

Figure 93 (Part 6 of 6). Physical Disk I/Os by Unit (Arm) and Object

10.2.16 Report Title - Physical I/Os by Mainstore Pool

This report is produced from Command Option - By Mainstore Pool.

```
                    Physical I/Os by mainstore pool.
                QUERY NAME . . . . . IOPOOL4
                LIBRARY NAME . . . . SMTRACE
                FILE         LIBRARY      MEMBER       FORMAT
                IOPOOL3      PFREXP2      PEXTRACE     IOPOOL3
                IOPOOL1      PFREXP2      PEXTRACE     IOPOOL1
                IOPOOL2      PFREXP2      PEXTRACE     IOPOOL2
                DATE . . . . . 08/02/96
                TIME . . . . . 18:55:32


Mainstore  I/O         I/O    Percent of all  Average bytes
pool       type        count  system I/Os     transferred
   07      *RS  A      2,965        3.13            4,096
           *RS  S      5,821        6.15            4,254
           *RSF S     40,763       43.07            5,508
           *RX  A     11,969       12.65            4,096
           *WSP S     23,972       25.33            8,757
                      85,490       90.32            6,087
   03      *RS  A         12         .01            4,096
           *RS  S        170         .18           14,722
           *RSF S      4,995        5.28            7,035
           *WS  S          4         .00            4,096
           *WSP S      1,843        1.95           10,190
                       7,024        7.42            8,042
   04      *RS  A          3         .00           21,845
           *RS  S         14         .01            9,362
           *RSF S        222         .23            4,225
           *RX  A      1,062        1.12           32,278
           *WS  A          3         .00            4,096
           *WS  S         28         .03            6,290
           *WSP S        338         .36            7,586
                       1,670        1.76           22,854
                                                  M05


Mainstore  I/O         I/O    Percent of all  Average bytes
pool       type        count  system I/Os     transferred
   02      *RS  S         30         .03            6,827
           *RSF S        125         .13            5,833
           *WS  A         12         .01            4,096
           *WS  S         73         .08           10,773
           *WSP A         13         .01            4,096
           *WSP S        118         .12           13,815
                         371         .39            9,307
   01      *RS  S          1         .00           32,768
           *RSF S         56         .06            4,096
           *WS  A          3         .00            4,096
           *WS  S          2         .00           16,384
           *WSP S         30         .03           13,380
                          92         .10            7,702
   00      *WS  S          4         .00            6,144
                          4         .00            6,144
* * *  E N D  O F  R E P O R T  * * *
```

Figure 94. Physical I/Os by Mainstore Pool

10.2.17 Report Title - Physical Disk I/Os by Mainstore Pool and Job/Task

This report is produced from Command Option - By Pool and Job/Task.

```
                    Physical disk I/Os by mainstore pool and job/task
                    Only includes jobs/tasks with 1% or more of a pool's I/Os
                        QUERY NAME . . . . . POOLT7
                        LIBRARY NAME . . . . SMTRACE
                        FILE         LIBRARY      MEMBER       FORMAT
                        POOLT4       PFREXP2      PEXTRACE     POOLT4
                        POOLT6       PFREXP2      PEXTRACE     POOLT6
                        POOLT1       PFREXP2      PEXTRACE     POOLT1
                        POOLT2       PFREXP2      PEXTRACE     POOLT2
                        TASKINFO     PFREXP2      PEXTRACE     TASKINFO
                        DATE . . . . . 08/02/96
                        TIME . . . . . 18:55:57
```

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
07	00008810	TSTIOC	A960126A	053543	*RS A	1,370	1.45	1.60	4,096
					*RS S	1,218	1.29	1.42	4,096
					*RSF S	7,724	8.16	9.03	5,421
					*RX A	11,969	12.65	14.00	4,096
						22,281	23.54	26.06	4,555
	0000880E	ILEAGNEW	A960126A	053541	*RS S	1,127	1.19	1.32	4,401
					*RSF S	18,499	19.54	21.64	5,968
						19,626	20.74	22.96	5,878
	00008814	OPENBAD	A960126A	053546	*RS A	1,595	1.69	1.87	4,096
					*RS S	3,470	3.67	4.06	4,262
					*RSF S	14,532	15.35	17.00	4,969
					*WSP S	4	.00	.00	19,456
						19,601	20.71	22.93	4,776
	0000006B	SMP00006			*WSP S	3,662	3.87	4.28	8,890
						3,662	3.87	4.28	8,890
	00000068	SMP00003			*WSP S	3,487	3.68	4.08	8,831
						3,487	3.68	4.08	8,831
	00000069	SMP00004			*WSP S	3,439	3.63	4.02	9,005
						3,439	3.63	4.02	9,005
	00000067	SMP00002			*WSP S	3,385	3.58	3.96	8,624

M05

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
07	00000067	SMP00002				3,385	3.58	3.96	8,624
	00000066	SMP00001			*WSP S	3,360	3.55	3.93	8,605
						3,360	3.55	3.93	8,605
	0000006A	SMP00005			*WSP S	3,320	3.51	3.88	8,761
						3,320	3.51	3.88	8,761
	0000006C	SMP00007			*WSP S	3,315	3.50	3.88	8,550
						3,315	3.50	3.88	8,550
03	00008408	JUNK	QSPLJOB	053464	*RS A	12	.01	.17	4,096
					*RS S	170	.18	2.42	14,722
					*RSF S	4,995	5.28	71.11	7,035
					*WS S	4	.00	.06	4,096
					*WSP S	2	.00	.03	4,096
						5,183	5.48	73.79	7,277
	00000068	SMP00003			*WSP S	304	.32	4.33	9,755
						304	.32	4.33	9,755
	0000006A	SMP00005			*WSP S	288	.30	4.10	9,500
						288	.30	4.10	9,500
	0000006C	SMP00007			*WSP S	276	.29	3.93	11,116
						276	.29	3.93	11,116
	00000069	SMP00004			*WSP S	265	.28	3.77	9,135

Figure 95 (Part 1 of 3). Physical Disk I/Os by Mainstore Pool

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
03	00000069	SMPO0004				265	.28	3.77	9,135
	00000066	SMPO0001			*WSP S	256	.27	3.64	9,616
						256	.27	3.64	9,616
	00000067	SMPO0002			*WSP S	244	.26	3.47	11,096
						244	.26	3.47	11,096
	0000006B	SMPO0006			*WSP S	208	.22	2.96	11,599
						208	.22	2.96	11,599
04	00007F6C	P23ARTVKE	A960126A	053319	*RS A	3	.00	.18	21,845
					*RS S	14	.01	.84	9,362
					*RSF S	222	.23	13.29	4,225
					*RX A	1,062	1.12	63.59	32,278
					*WS A	3	.00	.18	4,096
					*WS S	3	.00	.18	4,096
						1,307	1.38	78.26	27,114
	00000067	SMPO0002			*WSP S	61	.06	3.65	7,453
						61	.06	3.65	7,453
	00000069	SMPO0004			*WSP S	54	.06	3.23	7,206
						54	.06	3.23	7,206
	0000006B	SMPO0006			*WSP S	50	.05	2.99	7,619
						50	.05	2.99	7,619

M05

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
04	0000006C	SMPO0007			*WSP S	47	.05	2.81	7,495
						47	.05	2.81	7,495
	00000068	SMPO0003			*WSP S	45	.05	2.69	7,646
						45	.05	2.69	7,646
	0000006A	SMPO0005			*WSP S	41	.04	2.46	7,792
						41	.04	2.46	7,792
	00000066	SMPO0001			*WSP S	40	.04	2.40	8,090
						40	.04	2.40	8,090
	0000881E	PEXTRACE	A960126A	053555	*WS S	24	.03	1.44	6,656
						24	.03	1.44	6,656
02	0000881E	PEXTRACE	A960126A	053555	*RS S	29	.03	7.82	6,921
					*RSF S	113	.12	30.46	5,763
					*WS A	8	.01	2.16	4,096
					*WS S	57	.06	15.36	5,461
					*WSP A	11	.01	2.96	4,096
					*WSP S	32	.03	8.63	4,096
						250	.26	67.39	5,489
	000000EC	SCPF	QSYS	000000	*RS S	1	.00	.27	4,096
					*RSF S	4	.00	1.08	4,096
					*WS A	1	.00	.27	4,096

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
02	000000EC	SCPF	QSYS	000000	*WS S	4	.00	1.08	8,192
					*WSP A	2	.00	.54	4,096
					*WSP S	1	.00	.27	4,096
						13	.01	3.50	5,356
	00000066	SMPO0001			*WSP S	13	.01	3.50	9,767
						13	.01	3.50	9,767
	0000006B	SMPO0006			*WSP S	12	.01	3.23	9,557
						12	.01	3.23	9,557
	00000068	SMPO0003			*WSP S	12	.01	3.23	13,312
						12	.01	3.23	13,312
	00008408	JUNK	QSPLJOB	053464	*WS S	8	.01	2.16	52,736
					*WSP S	4	.00	1.08	52,224
						12	.01	3.23	52,565
	00000069	SMPO0004			*WSP S	10	.01	2.70	10,650
						10	.01	2.70	10,650
	0000006A	SMPO0005			*WSP S	9	.01	2.43	8,647
						9	.01	2.43	8,647
	0000006C	SMPO0007			*WSP S	9	.01	2.43	13,198
						9	.01	2.43	13,198
	00000067	SMPO0002			*WSP S	7	.01	1.89	8,777

Figure 95 (Part 2 of 3). Physical Disk I/Os by Mainstore Pool

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
02	00000067	SMP00002				7	.01	1.89	8,777
	00007F37	QTGTELNETS	QTCP	053298	*RSF S	7	.01	1.89	7,607
						7	.01	1.89	7,607
	00007F6C	P23ARTVKE	A960126A	053319	*WS A	3	.00	.81	4,096
					*WS S	3	.00	.81	4,096
						6	.01	1.62	4,096
	00008814	OPENBAD	A960126A	053546	*WSP S	6	.01	1.62	65,536
						6	.01	1.62	65,536
01	0000881E	PEXTRACE	A960126A	053555	*RSF S	20	.02	21.74	4,096
					*WS A	2	.00	2.17	4,096
					*WS S	1	.00	1.09	4,096
					*WSP S	1	.00	1.09	4,096
						24	.03	26.09	4,096
	00000116	SK-ASC007P			*RSF S	13	.01	14.13	4,096
						13	.01	14.13	4,096
	00007F6C	P23ARTVKE	A960126A	053319	*RSF S	9	.01	9.78	4,096
					*WS A	1	.00	1.09	4,096
						10	.01	10.87	4,096
	00008814	OPENBAD	A960126A	053546	*RSF S	3	.00	3.26	4,096
					*WSP S	6	.01	6.52	27,989

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
01	00008814	OPENBAD	A960126A	053546		9	.01	9.78	20,025
	0000880E	ILEAGNEW	A960126A	053541	*RSF S	1	.00	1.09	4,096
					*WSP S	7	.01	7.61	12,288
						8	.01	8.70	11,264
	0000006A	SMP00005			*WSP S	5	.01	5.43	8,192
						5	.01	5.43	8,192
	00000068	SMP00003			*WSP S	5	.01	5.43	10,650
						5	.01	5.43	10,650
	00000055	RMTMSAFETASK			*RS S	1	.00	1.09	32,768
					*RSF S	3	.00	3.26	4,096
						4	.00	4.35	11,264
	0000006C	SMP00007			*WSP S	4	.00	4.35	9,216
						4	.00	4.35	9,216
	0000004C	SMSIGNALEVENT			*RSF S	2	.00	2.17	4,096
						2	.00	2.17	4,096
	00007F37	QTGTELNETS	QTCP	053298	*RSF S	2	.00	2.17	4,096
						2	.00	2.17	4,096
	00008808	PEXSBSD	QSYS	053539	*RSF S	2	.00	2.17	4,096
						2	.00	2.17	4,096
	00000066	SMP00001			*WSP S	1	.00	1.09	8,192

M05

Mainstore pool	TDE number (in hex)	Job/Task name	Job user	Job number	I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average bytes transferred
01	00000066	SMP00001				1	.00	1.09	8,192
	00000067	SMP00002			*WSP S	1	.00	1.09	4,096
						1	.00	1.09	4,096
	00000092	SMXCSPRVSR			*RSF S	1	.00	1.09	4,096
						1	.00	1.09	4,096
	00007F0B	QSERVER	QSYS	053254	*WS S	1	.00	1.09	28,672
						1	.00	1.09	28,672
00	0000881E	PEXTRACE	A960126A	053555	*WS S	3	.00	75.00	5,461
						3	.00	75.00	5,461
	0000880E	ILEAGNEW	A960126A	053541	*WS S	1	.00	25.00	8,192
						1	.00	25.00	8,192

* * * E N D O F R E P O R T * * *

Figure 95 (Part 3 of 3). Physical Disk I/Os by Mainstore Pool

10.2.18 Report Title - Physical Disk I/Os by Mainstore Pool and Object Name

This report is produced from Command Option - By Pool and Object.

```
                    Physical disk I/Os by mainstore pool and object name.
                    Only includes objects which had 1+% of all system I/Os or
                    1+% of a pool's I/Os
                        QUERY NAME . . . . . POOLO7
                        LIBRARY NAME . . . . SMTRACE
                        FILE         LIBRARY      MEMBER       FORMAT
                        POOLO4       PFREXP2      PEXTRACE     POOLO4
                        POOLO6       PFREXP2      PEXTRACE     POOLO6
                        POOLO1       PFREXP2      PEXTRACE     POOLO1
                        POOLO2       PFREXP2      PEXTRACE     POOLO2
                        DATE . . . . . 08/02/96
                        TIME . . . . . 18:56:39
```

Mainstore pool	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
07	DSPOBJD	DSPOBJD	0B90	*RS A	1,370	1.45	1.60	4,096
				*RS S	473	.50	.55	4,096
				*RSF S	1,455	1.54	1.70	4,096
				*RX A	11,969	12.65	14.00	4,096
				*WSP S	498	.53	.58	4,096
					15,765	16.66	18.44	4,096
	*DESTROYED		0000	*RS S	2,601	2.75	3.04	4,104
				*RSF S	3,951	4.17	4.62	4,096
				*WSP S	3,300	3.49	3.86	14,074
					9,852	10.41	11.52	7,440
	ILEAGNEW	A960126A	1AEF	*RS S	18	.02	.02	22,300
				*RSF S	4,090	4.32	4.78	7,541
				*WSP S	4,586	4.85	5.36	18,988
					8,694	9.19	10.17	13,610
	FCFA2024DA00		0000	*RSF S	4,543	4.80	5.31	4,096
				*WSP S	3,324	3.51	3.89	6,484
					7,867	8.31	9.20	5,105
	OPEN5		0201	*RSF S	2,385	2.52	2.79	7,742
				*WSP S	322	.34	.38	4,096
					2,707	2.86	3.17	7,308

Mainstore pool	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
07	TESTIO		0201	*RSF S	1,929	2.04	2.26	5,663
				*WSP S	343	.36	.40	4,096
					2,272	2.40	2.66	5,426
	QCAWAREA		19EF	*RSF S	1,264	1.34	1.48	4,096
				*WSP S	995	1.05	1.16	4,096
					2,259	2.39	2.64	4,096
	OPENBAD	A960126A	1AEF	*RS S	23	.02	.03	27,960
				*RSF S	1,187	1.25	1.39	6,318
				*WSP S	881	.93	1.03	6,807
					2,091	2.21	2.45	6,762
	SEIZE LOCK RANGE		0000	*RSF S	1,025	1.08	1.20	4,096
				*WSP S	1,050	1.11	1.23	4,264
					2,075	2.19	2.43	4,181
	ILEAGN		0201	*RSF S	1,461	1.54	1.71	5,442
				*WSP S	272	.29	.32	4,096
					1,733	1.83	2.03	5,230
	PFO4	PFO4	0B90	*RS A	317	.33	.37	4,096
				*RS S	316	.33	.37	4,096
				*RSF S	545	.58	.64	4,096
				*WSP S	528	.56	.62	4,096

Figure 96 (Part 1 of 6). Physical I/Os by Mainstore Pool and Object Name

Mainstore pool	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
07	PF04	PF04	0B90		1,706	1.80	2.00	4,096
	PF03	PF03	0B90	*RS A	322	.34	.38	4,096
				*RS S	317	.33	.37	4,096
				*RSF S	522	.55	.61	4,096
				*WSP S	514	.54	.60	4,096
					1,675	1.77	1.96	4,096
	PF05	PF05	0B90	*RS A	318	.34	.37	4,096
				*RS S	317	.33	.37	4,096
				*RSF S	509	.54	.60	4,096
				*WSP S	528	.56	.62	4,096
					1,672	1.77	1.96	4,096
	PF02	PF02	0B90	*RS A	319	.34	.37	4,096
				*RS S	318	.34	.37	4,096
				*RSF S	495	.52	.58	4,096
				*WSP S	489	.52	.57	4,096
					1,621	1.71	1.90	4,096
	PF01	PF01	0B90	*RS A	319	.34	.37	4,096
				*RS S	319	.34	.37	4,096
				*RSF S	469	.50	.55	4,096
				*WSP S	489	.52	.57	4,096

Mainstore pool	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
07	PF01	PF01	0B90		1,596	1.69	1.87	4,096
	QRNXDUMP		0203	*RSF S	1,012	1.07	1.18	4,096
				*WSP S	417	.44	.49	4,096
					1,429	1.51	1.67	4,096
	C3E62C0360O4		0000	*RSF S	623	.66	.73	4,096
				*WSP S	748	.79	.87	4,096
					1,371	1.45	1.60	4,096
	HATT		0401	*RSF S	1,246	1.32	1.46	4,096
					1,246	1.32	1.46	4,096
	F5075E5540O4		0000	*RSF S	493	.52	.58	4,096
				*WSP S	596	.63	.70	4,096
					1,089	1.15	1.27	4,096
	C2E7BB3D70O4		0000	*RSF S	480	.51	.56	4,096
				*WSP S	581	.61	.68	4,096
					1,061	1.12	1.24	4,096
	FD3057655OO4		0000	*RSF S	490	.52	.57	4,096
				*WSP S	540	.57	.63	4,096
					1,030	1.09	1.20	4,096
	D3334BC40OO4		0000	*RSF S	469	.50	.55	4,096
				*WSP S	551	.58	.64	4,096
					M05			

Mainstore pool	Object name and type/subtype			I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
07	D3334BC40OO4		0000		1,020	1.08	1.19	4,096
	D7A7822472OO		0000	*RSF S	732	.77	.86	12,596
				*WSP S	279	.29	.33	4,096
					1,011	1.07	1.18	10,250
	F3CA6CD120O4		0000	*RSF S	457	.48	.53	4,096
				*WSP S	515	.54	.60	4,096
					972	1.03	1.14	4,096
	F86D14F540O4		0000	*RSF S	354	.37	.41	4,096
				*WSP S	617	.65	.72	4,096
					971	1.03	1.14	4,096
	OPENBAD		0201	*RSF S	965	1.02	1.13	5,484
					965	1.02	1.13	5,484
	TESTIOC		0201	*RSF S	871	.92	1.02	6,104
					871	.92	1.02	6,104
03	JUNK	QSPLJOB	1AEF	*RS S	56	.06	.80	32,183
				*RSF S	690	.73	9.82	7,123
				*WS S	4	.00	.06	4,096
				*WSP S	732	.77	10.42	16,988
					1,482	1.57	21.10	12,935
	D2FB76C772OO		0000	*RSF S	787	.83	11.20	4,096

Figure 96 (Part 2 of 6). Physical I/Os by Mainstore Pool and Object Name

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
03	D2FB76C7720O	0000	*WSP S	368	.39	5.24	5,498
				1,155	1.22	16.44	4,543
	QSOSRV2	0203	*RSF S	371	.39	5.28	12,189
			*WSP S	13	.01	.19	4,096
				384	.41	5.47	11,915
	*DESTROYED	0000	*RSF S	239	.25	3.40	4,096
			*WSP S	100	.11	1.42	13,517
				339	.36	4.83	6,875
	QTMPLPRC	0201	*RSF S	266	.28	3.79	11,580
			*WSP S	14	.01	.20	4,096
				280	.30	3.99	11,205
	QSOKERN3	0203	*RSF S	214	.23	3.05	14,776
				214	.23	3.05	14,776
	QJOBMSGQ	18A0	*RSF S	139	.15	1.98	4,096
			*WSP S	71	.08	1.01	7,038
				210	.22	2.99	5,091
	E7CB3ED3600O4	0000	*RSF S	90	.10	1.28	4,096
			*WSP S	106	.11	1.51	4,096
				196	.21	2.79	4,096
	L/L RANGE 1	0000	*RSF S	188	.20	2.68	4,096
				M05			

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
03	L/L RANGE 1	0000		188	.20	2.68	4,096
	QSOSRV1	0203	*RSF S	143	.15	2.04	7,304
			*WSP S	13	.01	.19	4,096
				156	.16	2.22	7,037
	SQCCSID1	0ED2	*RSF S	110	.12	1.57	4,096
			*WSP S	31	.03	.44	4,096
				141	.15	2.01	4,096
	E43BF962E50O	0000	*RSF S	69	.07	.98	4,096
			*WSP S	47	.05	.67	6,536
				116	.12	1.65	5,085
	SEIZE LOCK RANGE	0000	*RSF S	60	.06	.85	4,096
			*WSP S	56	.06	.80	4,315
				116	.12	1.65	4,202
	QATOCTCPIPCONFIG	0C90	*RSF S	67	.07	.95	4,096
			*WSP S	41	.04	.58	4,096
				108	.11	1.54	4,096
	QATOCTCPIPCONFIG	0B90	*RS S	17	.02	.24	4,096
			*RSF S	52	.05	.74	4,096
			*WSP S	30	.03	.43	4,096
				99	.10	1.41	4,096

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
03	QTQICONV	0203	*RSF S	81	.09	1.15	6,018
			*WSP S	13	.01	.19	4,096
				94	.10	1.34	5,752
	QPOLLIB1	0203	*RSF S	72	.08	1.03	9,842
			*WSP S	13	.01	.19	4,096
				85	.09	1.21	8,963
	CB409AF8A004	0000	*RSF S	84	.09	1.20	4,096
				84	.09	1.20	4,096
	EEE05252CB0O	0000	*RSF S	61	.06	.87	15,175
			*WSP S	23	.02	.33	4,096
				84	.09	1.20	12,142
	F4E3FAD8D004	0000	*RSF S	84	.09	1.20	4,096
				84	.09	1.20	4,096
	FC64411FC004	0000	*RSF S	41	.04	.58	4,096
			*WSP S	42	.04	.60	4,096
				83	.09	1.18	4,096
	QYPPRT	0203	*RSF S	66	.07	.94	9,185
			*WSP S	13	.01	.19	4,096
				79	.08	1.12	8,348
	F836A3DBEA0O	0000	*RSF S	50	.05	.71	4,096

Figure 96 (Part 3 of 6). Physical I/Os by Mainstore Pool and Object Name

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
03	F836A3DBEA00	0000	*WSP S	25	.03	.36	4,096
				75	.08	1.07	4,096
	QC2UTIL1	0203	*RSF S	72	.08	1.03	16,384
				72	.08	1.03	16,384
	QSO_DNS_INDEX	0EEF	*RSF S	60	.06	.85	4,096
			*WSP S	12	.01	.17	4,096
				72	.08	1.03	4,096
04	QWCBT01	19D0	*RS A	3	.00	.18	21,845
			*RS S	3	.00	.18	19,115
			*RSF S	99	.10	5.93	4,096
			*RX A	1,062	1.12	63.59	32,278
				1,167	1.23	69.88	29,827
	QJOBMSGQ	18A0	*RSF S	9	.01	.54	4,096
			*WS S	1	.00	.06	4,096
			*WSP S	278	.29	16.65	8,192
				288	.30	17.25	8,050
	SEIZE LOCK RANGE	0000	*RSF S	3	.00	.18	4,096
			*WSP S	60	.06	3.59	4,779
				63	.07	3.77	4,746
02	Q04079N002Q097276464	0B90	*RSF S	2	.00	.54	4,096
				M05			

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
02	Q04079N002Q097276464	0B90	*WS S	30	.03	8.09	5,461
			*WSP A	10	.01	2.70	4,096
			*WSP S	5	.01	1.35	4,096
				47	.05	12.67	4,967
	SEIZE LOCK RANGE	0000	*RSF S	5	.01	1.35	4,096
			*WSP S	25	.03	6.74	10,322
				30	.03	8.09	9,284
	D1EDE9BC4700	0000	*RSF S	1	.00	.27	4,096
			*WSP S	26	.03	7.01	8,350
				27	.03	7.28	8,192
	QSPSCB	19C2	*WS S	1	.00	.27	4,096
			*WSP S	23	.02	6.20	4,096
				24	.03	6.47	4,096
	ECB9E6FE0E00	0000	*WSP S	21	.02	5.66	13,848
				21	.02	5.66	13,848
	PF132 PEXTRACSTS	0B90	*WS A	5	.01	1.35	4,096
			*WS S	9	.01	2.43	4,096
			*WSP A	1	.00	.27	4,096
			*WSP S	4	.00	1.08	4,096
				19	.02	5.12	4,096

Mainstore pool	Object name and type/subtype		I/O type	I/O count	Percent of ALL system I/Os	Percent of this pool's I/Os	Average types transferred
02	UIM_TEMPORARY_WORKSP	19EF	*RS S	16	.02	4.31	4,096
			*RSF S	3	.00	.81	4,096
				19	.02	5.12	4,096
	DATA BASE IN-USE TBL	0000	*WS S	17	.02	4.58	7,228
				17	.02	4.58	7,228
	*DESTROYED	0000	*RS S	1	.00	.27	4,096
			*RSF S	10	.01	2.70	4,096
			*WS A	2	.00	.54	4,096
			*WS S	1	.00	.27	4,096
				14	.01	3.77	4,096
	JUNK QSPLJOB	1AEF	*WS S	8	.01	2.16	52,736
			*WSP S	4	.00	1.08	52,224
				12	.01	3.23	52,565
	QSYS	0401	*RSF S	8	.01	2.16	4,096
				8	.01	2.16	4,096
	OPENBAD A960126A	1AEF	*WSP S	6	.01	1.62	65,536
				6	.01	1.62	65,536
	QSPCPYF	0201	*RS S	2	.00	.54	26,624
			*RSF S	4	.00	1.08	7,168
				6	.01	1.62	13,653

Figure 96 (Part 4 of 6). Physical I/Os by Mainstore Pool and Object Name

```
Mainstore  Object name                 I/O type      I/O    Percent of ALL  Percent of this  Average types
pool       and type/subtype                           count  system I/Os     pool's I/Os      transferred
   02      QWPALLOC              0201   *RSF S            6         .01            1.62           10,923
                                                          6         .01            1.62           10,923
           A960126A              0801   *RSF S            5         .01            1.35            4,096
                                                          5         .01            1.35            4,096
           FD4657807900          0000   *RSF S            5         .01            1.35            4,096
                                                          5         .01            1.35            4,096
           QCPFMSG               0E03   *RSF S            5         .01            1.35            4,096
                                                          5         .01            1.35            4,096
           QHST96213DQHST96213D  0B90   *WS  S            2         .00             .54            4,096
                                        *WSP A            1         .00             .27            4,096
                                        *WSP S            1         .00             .27            4,096
                                                          4         .00            1.08            4,096
           QSPCNSPF              0201   *RSF S            4         .00            1.08            9,216
                                                          4         .00            1.08            9,216
           QSPHNMLT              0201   *RS  S            2         .00             .54           10,240
                                        *RSF S            2         .00             .54           10,240
                                                          4         .00            1.08           10,240
           QTGTNTOC              0201   *RSF S            4         .00            1.08            8,192
                                                          4         .00            1.08            8,192
           QUICLOSE              0201   *RS  S            2         .00             .54           10,240

Mainstore  Object name                 I/O type      I/O    Percent of ALL  Percent of this  Average types
pool       and type/subtype                           count  system I/Os     pool's I/Os      transferred
   02      QUICLOSE              0201   *RSF S            2         .00             .54            8,192
                                                          4         .00            1.08            9,216
           SQCCSID1              0ED2   *RSF S            4         .00            1.08            4,096
                                                          4         .00            1.08            4,096
   01      SM PERM DIR SEGMENT   0000   *RSF S           33         .03           35.87            4,096
                                                         33         .03           35.87            4,096
           E43BF962E500          0000   *RSF S           12         .01           13.04            4,096
                                        *WSP S            8         .01            8.70           11,264
                                                         20         .02           21.74            6,963
           ILEAGNEW  A960126A    1AEF   *RS  S            1         .00            1.09           32,768
                                        *WSP S           13         .01           14.13           10,082
                                                         14         .01           15.22           11,703
           OPENBAD   A960126A    1AEF   *WSP S            6         .01            6.52           27,989
                                                          6         .01            6.52           27,989
           PF132     PEXTRACSTS  0D50   *WS  A            2         .00            2.17            4,096
                                        *WS  S            1         .00            1.09            4,096
                                        *WSP S            1         .00            1.09            4,096
                                                          4         .00            4.35            4,096
           D1EDE9BC4700          0000   *RSF S            3         .00            3.26            4,096
                                                          3         .00            3.26            4,096
                                                    M05

Mainstore  Object name                 I/O type      I/O    Percent of ALL  Percent of this  Average types
pool       and type/subtype                           count  system I/Os     pool's I/Os      transferred
   01      *DESTROYED            0000   *RSF S            2         .00            2.17            4,096
                                                          2         .00            2.17            4,096
           FE38ECDB8004          0000   *WSP S            2         .00            2.17            4,096
                                                          2         .00            2.17            4,096
           RLSJOB                1905   *RSF S            1         .00            1.09            4,096
                                        *WS  A            1         .00            1.09            4,096
                                                          2         .00            2.17            4,096
           CPYSPLF               1905   *RSF S            1         .00            1.09            4,096
                                                          1         .00            1.09            4,096
           C2D22017B100          0000   *RSF S            1         .00            1.09            4,096
                                                          1         .00            1.09            4,096
           ENDPEX                1905   *RSF S            1         .00            1.09            4,096
                                                          1         .00            1.09            4,096
           FC88D12A5700          0000   *RSF S            1         .00            1.09            4,096
                                                          1         .00            1.09            4,096
           FREE SPACE MAP RANGE  0000   *RSF S            1         .00            1.09            4,096
                                                          1         .00            1.09            4,096
           QSERVER   QSYS        1AEF   *WS  S            1         .00            1.09           28,672
                                                          1         .00            1.09           28,672
   00      *SECTOR I/O           0000   *WS  S            4         .00          100.00            6,144
```

Figure 96 (Part 5 of 6). Physical I/Os by Mainstore Pool and Object Name

```
Mainstore  Object name                 I/O type      I/O    Percent of ALL  Percent of this  Average types
pool       and type/subtype                           count  system I/Os     pool's I/Os      transferred
   00      *SECTOR I/O           0000                   4         .00          100.00            6,144
* * *  E N D  O F  R E P O R T  * * *
```

Figure 96 (Part 6 of 6). Physical I/Os by Mainstore Pool and Object Name

10.2.19 Report Title - I/O by Object Type

This report is produced from Command Option - By Object/Segment Type.

```
                                IO bu Object Type
                    QUERY NAME . . . . . IOOBJT07
                    LIBRARY NAME . . . . SMTRACE
                    FILE         LIBRARY      MEMBER       FORMAT
                    IOOBJT06     PFREXP2      PEXTRACE     IOOBJT06
                    IOOBJT05     PFREXP2      PEXTRACE     IOOBJT05
                    DATE . . . . . 08/02/96
                    TIME . . . . . 18:57:36
                              IO by Object Type - Part 12


08/02/96  18:57:36              IO by Object Type               PAGE    1
Description                        PDIO            PDIO     Pct      Pct
                                   Oper            Count    Oper     All
                                                            PDIO     PDIO
COMPOSITE PIECE - DATA SPACE       *RX  A         11,969   49.40    12.65
                                   *RSF S          4,049   16.71     4.28
                                   *WSP S          3,086   12.74     3.26
                                   *RS  A          2,977   12.29     3.15
                                   *RS  S          2,089    8.62     2.21
                                   *WS  S             41     .17      .04
                                   *WSP A             12     .05      .01
                                   *WS  A              5     .02      .01
                                     TOTAL        24,228

TEMPORARY - PROCESS CTL SPACE      *WSP S          6,230   50.31     6.58
                                   *RSF S          6,041   48.78     6.38
                                   *RS  S             98     .79      .10
                                   *WS  S             14     .11      .01
                                     TOTAL        12,383
PROGRAM                            *RSF S          9,989   82.11    10.55
                                   *RS  S          1,226   10.08     1.30
                                   *WSP S            951    7.82     1.00
                                     TOTAL        12,166
*UNKNOWN***************************  *RSF S          4,418   42.42     4.67
                                   *WSP S          3,388   32.53     3.58
                                   *RS  S          2,602   24.98     2.75
                                   *WS  S              5     .05      .01
                                   *WS  A              2     .02      .00
                                     TOTAL        10,415
HEAP DATA SEGMENT TYPE             *RSF S          5,345   59.15     5.65
                                   *WSP S          3,692   40.85     3.90
                                     TOTAL         9,037
                                               MO5


08/02/96  18:57:36              IO by Object Type               PAGE    2
Description                        PDIO            PDIO     Pct      Pct
                                   Oper            Count    Oper     All
                                                            PDIO     PDIO
DATA SPACE RUN TIME SID            *WSP S          3,442   55.28     3.64
                                   *RSF S          2,785   44.72     2.94
                                     TOTAL         6,227
SERVICE PROGRAM                    *RSF S          3,460   80.63     3.66
                                   *WSP S            831   19.37      .88
                                     TOTAL         4,291
TEMPORARY - SPACE                  *RSF S          1,579   60.18     1.67
                                   *WSP S          1,027   39.14     1.09
                                   *RS  S             18     .69      .02
                                     TOTAL         2,624
HOLD RECORD SEG                    *WSP S          1,191   52.15     1.26
                                   *RSF S          1,093   47.85     1.15
                                     TOTAL         2,284
FILE                               *RSF S          1,933   99.90     2.04
                                   *WS  A              2     .10      .00
                                     TOTAL         1,935
LIBRARY                            *RSF S          1,774   99.27     1.87
                                   *WSP S              7     .39      .01
                                   *WS  S              6     .34      .01
                                     TOTAL         1,787
TOMBSTONE SEGMENT                  *WSP S            886   54.22      .94
                                   *RSF S            748   45.78      .79
                                     TOTAL         1,634
```

Figure 97 (Part 1 of 4). IO by Object Type

```
08/02/96  18:57:36              IO by Object Type                PAGE    3
Description                        PDIO            PDIO     Pct      Pct
                                   Oper            Count    Oper     All
                                                            PDIO     PDIO
WORK CONTROL BLOCK TABLE           *RX  A          1,062   90.38     1.12
                                   *RSF S            107    9.11      .11
                                   *RS  A              3     .26      .00
                                   *RS  S              3     .26      .00
                                     TOTAL         1,175
MODUL2 STATIC STORE                *RSF S            793   72.42      .84
                                   *WSP S            302   27.58      .32
                                     TOTAL         1,095
JOB MESSAGE QUEUE                  *WSP S            627   59.71      .66
                                   *RSF S            422   40.19      .45
                                   *WS  S              1     .10      .00
                                     TOTAL         1,050
HEAP CONTROL SEGMENT               *WSP S            281   50.09      .30
                                   *RSF S            280   49.91      .30
                                     TOTAL           561
USER PROFILE                       *RSF S            460   99.14      .49
                                   *WS  S              4     .86      .00
                                     TOTAL           464
MWS AREA DATA SID                  *RSF S            174   60.63      .18
                                   *WSP S            113   39.37      .12
                                     TOTAL           287
ACTIVATION PROC REF TBL            *RSF S            168  100.00      .18
                                     TOTAL           168
                                 M05


08/02/96  18:57:36              IO by Object Type                PAGE    4
Description                        PDIO            PDIO     Pct      Pct
                                   Oper            Count    Oper     All
                                                            PDIO     PDIO
CCSID INFORMATION OBJECT           *RSF S            114   78.62      .12
                                   *WSP S             31   21.38      .03
                                     TOTAL           145
COMPOSITE PIECE - DATA SPACE INDEX *RSF S             67   62.04      .07
                                   *WSP S             41   37.96      .04
                                     TOTAL           108
PROTECTED SPACE                    *RSF S             53   52.48      .06
                                   *WSP S             48   47.52      .05
                                     TOTAL           101
TEMPORARY - INDEX                  *RSF S             61   83.56      .06
                                   *WSP S             12   16.44      .01
                                     TOTAL            73
MESSAGE FILE                       *RSF S             63   91.30      .07
                                   *WSP S              6    8.70      .01
                                     TOTAL            69
MUTEX TEMP SEGMENT                 *RSF S             32   60.38      .03
                                   *WSP S             21   39.62      .02
                                     TOTAL            53
DATA SPACE INDEX RUN TIME          *WSP S             27   51.92      .03
                                   *RSF S             25   48.08      .03
                                     TOTAL            52
ACCESS GROUP                       *RSF S             26   68.42      .03
```

Figure 97 (Part 2 of 4). IO by Object Type

```
08/02/96  18:57:36              IO by Object Type                PAGE    5
Description                        PDIO            PDIO     Pct      Pct
                                   Oper            Count    Oper     All
                                                            PDIO     PDIO
ACCESS GROUP                       *WSP S             12   31.58      .01
                                     TOTAL            38
SPOOL CTL BLOCK                    *WSP S             23   63.89      .02
                                   *RSF S              9   25.00      .01
                                   *WS  S              4   11.11      .00
                                     TOTAL            36
MWS AREA CTL SID                   *WSP S             17   54.84      .02
                                   *RSF S             14   45.16      .01
                                     TOTAL            31
DB IN USE TABLE                    *WS  S             17  100.00      .02
                                     TOTAL            17
OUTPUT QUEUE                       *WS  S             15   88.24      .02
                                   *RSF S              2   11.76      .00
                                     TOTAL            17
LOCAL DATA AREA                    *RSF S             14  100.00      .01
                                     TOTAL            14
PANEL GROUP DEFINITION             *RSF S             14  100.00      .01
                                     TOTAL            14
FILE FORMAT                        *RSF S             13  100.00      .01
                                     TOTAL            13
                                                MO5


08/02/96  18:57:36              IO by Object Type                PAGE    6
Description                        PDIO            PDIO     Pct      Pct
                                   Oper            Count    Oper     All
                                                            PDIO     PDIO
TEMPORARY - QUEUE                  *WSP S              7   53.85      .01
                                   *RSF S              6   46.15      .01
                                     TOTAL            13
PRINT QUEUE                        *RSF S             12  100.00      .01
                                     TOTAL            12
MESSAGE QUEUE                      *WS  A              6   60.00      .01
                                   *WS  S              3   30.00      .00
                                   *RSF S              1   10.00      .00
                                     TOTAL            10
TABLE                              *RSF S              6  100.00      .01
                                     TOTAL             6
COMMAND                            *RSF S              3   75.00      .00
                                   *WS  A              1   25.00      .00
                                     TOTAL             4
DATA BASE FILE MEMBER              *WS  A              2   50.00      .00
                                   *WS  S              1   25.00      .00
                                   *WSP S              1   25.00      .00
                                     TOTAL             4
OIR SPACE                          *RSF S              1   50.00      .00
                                   *WSP A              1   50.00      .00
                                     TOTAL             2
CHANGED PAGE BITMAP                *RSF S              1  100.00      .00
```

Figure 97 (Part 3 of 4). IO by Object Type

```
08/02/96  18:57:36              IO by Object Type                PAGE    7
Description                        PDIO            PDIO     Pct      Pct
                                   Oper            Count    Oper     All
                                                            PDIO     PDIO
                                     TOTAL             1
COMPOSITE PIECE - INDEX            *RSF S              1  100.00      .00
                                     TOTAL             1
DATA BASE OPERATIONAL CURSOR       *WSP S              1  100.00      .00
                                     TOTAL             1
FILE AVAIL CTL BLOCK               *RSF S              1  100.00      .00
                                     TOTAL             1
SUBSYSTEM DESCRIPTION              *RSF S              1  100.00      .00
                                     TOTAL             1
TEMPORARY - ACCESS GROUP           *RSF S              1  100.00      .00
                                     TOTAL             1
                                     FINAL TOTALS
                                     TOTAL        94,649
* * *  E N D  O F  R E P O R T  * * *
```

Figure 97 (Part 4 of 4). IO by Object Type

10.2.20 Report Title - Program I/O Type Detail

This report is produced from Command Option - By **PGM.

```
                                Program IO Type Detail
                        QUERY NAME . . . . . PGMIO07
                        LIBRARY NAME . . . . SMTRACE
                        FILE         LIBRARY      MEMBER       FORMAT
                        PGMIO06      PFREXP2      PEXTRACE     PGMIO06
                        PGMIO05      PFREXP2      PEXTRACE     PGMIO05
                        DATE . . . . . 08/02/96
                        TIME . . . . . 18:58:07
                                Pgm IO Detail - Part 8


08/02/96  18:58:07      Program IO Type Detail      PAGE    1
Program     PDIO           PDIO      PCT      PCT   PCT PGM
            Oper           Count     Pgm      ALL   IO of
                                     IO       IO    ALL IO
TOPOFSTACK  *WSP S         26,235   98.66    27.72     28.09
            *RSF S            329    1.24      .35     28.09
            *RS  S             26     .10      .03     28.09
            *WS  S              2     .01      .00     28.09
              TOTAL        26,592
TESTIO      *RX  A         11,969   65.33    12.65     19.36
            *RSF S          3,765   20.55     3.98     19.36
            *RS  A          1,370    7.48     1.45     19.36
            *RS  S          1,218    6.65     1.29     19.36
              TOTAL        18,322
ILEAGNEW    *RSF S         17,042   93.84    18.01     19.19
            *RS  S          1,117    6.15     1.18     19.19
            *WS  S              2     .01      .00     19.19
              TOTAL        18,161
OPEN5       *RSF S         11,761   69.96    12.43     17.76
            *RS  S          3,456   20.56     3.65     17.76
            *RS  A          1,595    9.49     1.69     17.76
              TOTAL        16,812
TESTIOC     *RSF S          3,936  100.00     4.16      4.16
              TOTAL         3,936
QCMDEXC     *RSF S          3,513   97.69     3.71      3.80
            *RS  S             83    2.31      .09      3.80
              TOTAL         3,596
OPENBAD     *RSF S          2,687   99.78     2.84      2.85


08/02/96  18:58:07      Program IO Type Detail      PAGE    2
Program     PDIO           PDIO      PCT      PCT   PCT PGM
            Oper           Count     Pgm      ALL   IO of
                                     IO       IO    ALL IO
OPENBAD     *RS  S              6     .22      .01      2.85
              TOTAL         2,693
ILEAGN      *RSF S          1,428  100.00     1.51      1.51
              TOTAL         1,428
QWTCCRLJ    *RX  A          1,062   97.97     1.12      1.15
            *RSF S             15    1.38      .02      1.15
            *RS  S              4     .37      .00      1.15
            *RS  A              3     .28      .00      1.15
              TOTAL         1,084
QDMCOPEN    *RSF S            324  100.00      .34       .34
              TOTAL           324
QDBOPEN     *RSF S            267   98.52      .28       .29
            *RS  S              4    1.48      .00       .29
              TOTAL           271
QDBGETKY    *RSF S            143   77.72      .15       .19
            *RS  S             29   15.76      .03       .19
            *RS  A             12    6.52      .01       .19
              TOTAL           184
QMHSNDPM    *RSF S            159   99.38      .17       .17
            *RS  S              1     .63      .00       .17
              TOTAL           160
QWCDLYJB    *WSP S             32   44.44      .03       .08
```

Figure 98 (Part 1 of 5). Program IO Type Detail

```
08/02/96  18:58:07      Program IO Type Detail      PAGE    3
Program     PDIO            PDIO      PCT      PCT   PCT PGM
            Oper            Count     Pgm      ALL   IO of
                                      IO       IO    ALL IO
QWCDLYJB    *RSF S             27   37.50      .03       .08
            *WS  S             12   16.67      .01       .08
            *RS  S              1    1.39      .00       .08
              TOTAL            72
QCLCLCPR    *RSF S             68   98.55      .07       .07
            *RS  S              1    1.45      .00       .07
              TOTAL            69
QMHRSNEM    *RSF S             61  100.00      .06       .06
              TOTAL            61
QLIDLOBJ    *RSF S             53  100.00      .06       .06
              TOTAL            53
QSPRCMBR    *WS  S             31   64.58      .03       .05
            *WSP S             12   25.00      .01       .05
            *RSF S              5   10.42      .01       .05
              TOTAL            48
QCATRS      *RSF S             43   97.73      .05       .05
            *WS  A              1    2.27      .00       .05
              TOTAL            44
QDMCLOSE    *RSF S             37   86.05      .04       .05
            *WS  S              4    9.30      .00       .05
            *RS  S              1    2.33      .00       .05
            *WS  A              1    2.33      .00       .05
              TOTAL            43
                                                  MO5


08/02/96  18:58:07      Program IO Type Detail      PAGE    4
Program     PDIO            PDIO      PCT      PCT   PCT PGM
            Oper            Count     Pgm      ALL   IO of
                                      IO       IO    ALL IO
QSPOPEN     *RSF S             23   54.76      .02       .04
            *WSP S             10   23.81      .01       .04
            *WS  S              7   16.67      .01       .04
            *RS  S              2    4.76      .00       .04
              TOTAL            42
QMHMOVPM    *RSF S             36  100.00      .04       .04
              TOTAL            36
QSQENDAG    *RSF S             36  100.00      .04       .04
              TOTAL            36
QCANPARS    *RSF S             35  100.00      .04       .04
              TOTAL            35
QSPCLOSE    *WS  S             16   47.06      .02       .04
            *WSP A             10   29.41      .01       .04
            *WSP S              6   17.65      .01       .04
            *RSF S              2    5.88      .00       .04
              TOTAL            34
QDBCRTME    *WS  S             13   40.63      .01       .03
            *RSF S             10   31.25      .01       .03
            *WS  A              9   28.13      .01       .03
              TOTAL            32
QLICHLLE    *RSF S             32  100.00      .03       .03
              TOTAL            32
```

Figure 98 (Part 2 of 5). Program IO Type Detail

```
08/02/96  18:58:07      Program IO Type Detail      PAGE    5
Program     PDIO           PDIO      PCT      PCT   PCT PGM
            Oper           Count     Pgm      ALL   IO of
                                     IO       IO    ALL IO
QCADRV2     *RS  S            26   89.66      .03       .03
            *RSF S             3   10.34      .00       .03
              TOTAL           29
QMHPDEH     *RSF S            27  100.00      .03       .03
              TOTAL           27
QCARULE     *RSF S            26  100.00      .03       .03
              TOTAL           26
QCACHLBL    *RSF S            13   52.00      .01       .03
            *RS  S            12   48.00      .01       .03
              TOTAL           25
QCAIEXIT    *RSF S            25  100.00      .03       .03
              TOTAL           25
QUIMGFLW    *RS  S            13   52.00      .01       .03
            *RSF S            12   48.00      .01       .03
              TOTAL           25
QUSRJOBI    *RSF S            22  100.00      .02       .02
              TOTAL           22
QWCCDSTC    *RSF S            18   81.82      .02       .02
            *RS  S             4   18.18      .00       .02
              TOTAL           22
                                                 MO5


08/02/96  18:58:07      Program IO Type Detail      PAGE    6
Program     PDIO           PDIO      PCT      PCT   PCT PGM
            Oper           Count     Pgm      ALL   IO of
                                     IO       IO    ALL IO
QDBFEOD     *WS  S            13   68.42      .01       .02
            *WSP S             4   21.05      .00       .02
            *WSP A             2   10.53      .00       .02
              TOTAL           19
QMHCHGEM    *RSF S            14  100.00      .01       .01
              TOTAL           14
QMHSNSTQ    *WS  A             6   42.86      .01       .01
            *RSF S             5   35.71      .01       .01
            *WS  S             3   21.43      .00       .01
              TOTAL           14
QCADRV      *RS  S             8   61.54      .01       .01
            *RSF S             5   38.46      .01       .01
              TOTAL           13
QDBCLOSE    *RSF S            13  100.00      .01       .01
              TOTAL           13
QUSDLTUS    *RSF S            13  100.00      .01       .01
              TOTAL           13
QDCXLATE    *RSF S            12  100.00      .01       .01
              TOTAL           12
QDMRCLSE    *RSF S             6   54.55      .01       .01
            *RS  S             5   45.45      .01       .01
```

Figure 98 (Part 3 of 5). Program IO Type Detail

```
08/02/96  18:58:07      Program IO Type Detail      PAGE    7
Program     PDIO            PDIO      PCT      PCT   PCT PGM
            Oper            Count     Pgm      ALL   IO of
                                      IO       IO    ALL IO
              TOTAL            11
QSPCNSPF    *RSF S            5   50.00      .01       .01
            *WS  S            5   50.00      .01       .01
              TOTAL            10
QUIPRINT    *RS  S            7   70.00      .01       .01
            *RSF S            3   30.00      .00       .01
              TOTAL            10
QMHRTMSS    *RSF S            9  100.00      .01       .01
              TOTAL             9
QWTMMRLJ    *RSF S            9  100.00      .01       .01
              TOTAL             9
QMHRCVPM    *RSF S            8  100.00      .01       .01
              TOTAL             8
QSPCPYF     *RSF S            6   75.00      .01       .01
            *RS  S            2   25.00      .00       .01
              TOTAL             8
QTMPCKP     *RSF S            7  100.00      .01       .01
              TOTAL             7
QWTMESBC    *RS  S            6   85.71      .01       .01
            *RSF S            1   14.29      .00       .01


08/02/96  18:58:07      Program IO Type Detail      PAGE    8
Program     PDIO            PDIO      PCT      PCT   PCT PGM
            Oper            Count     Pgm      ALL   IO of
                                      IO       IO    ALL IO
              TOTAL             7
QLICNV      *RSF S            6  100.00      .01       .01
              TOTAL             6
QTQGESP     *RSF S            6  100.00      .01       .01
              TOTAL             6
QUICMD      *RS  S            4   66.67      .00       .01
            *RSF S            2   33.33      .00       .01
              TOTAL             6
QWPALLOC    *RSF S            6  100.00      .01       .01
              TOTAL             6
QSYGRTSA    *RSF S            3   60.00      .00       .01
            *WSP S            2   40.00      .00       .01
              TOTAL             5
QSPCHJOB    *WS  S            3   75.00      .00       .00
            *RSF S            1   25.00      .00       .00
              TOTAL             4
QUIRCLAP    *RSF S            4  100.00      .00       .00
              TOTAL             4
QLIMROIR    *RSF S            2   66.67      .00       .00
            *WSP A            1   33.33      .00       .00


08/02/96  18:58:07      Program IO Type Detail      PAGE    9
Program     PDIO            PDIO      PCT      PCT   PCT PGM
            Oper            Count     Pgm      ALL   IO of
                                      IO       IO    ALL IO
              TOTAL             3
QUICLOSE    *RSF S            3  100.00      .00       .00
              TOTAL             3
QUIICHK     *RSF S            3  100.00      .00       .00
              TOTAL             3
QCAIFLD     *RSF S            2  100.00      .00       .00
              TOTAL             2
QEZWRAST    *RSF S            2  100.00      .00       .00
              TOTAL             2
QSPDSPFX    *RSF S            2  100.00      .00       .00
              TOTAL             2
QTGTNTOC    *RSF S            2  100.00      .00       .00
              TOTAL             2
QUICBINT    *RSF S            2  100.00      .00       .00
              TOTAL             2
QUIEXFMT    *RSF S            2  100.00      .00       .00
              TOTAL             2
QUIINMGR    *RSF S            2  100.00      .00       .00
```

Figure 98 (Part 4 of 5). Program IO Type Detail

```
08/02/96  18:58:07      Program IO Type Detail      PAGE   10
Program     PDIO            PDIO      PCT      PCT   PCT PGM
            Oper            Count     Pgm      ALL   IO of
                                      IO       IO    ALL IO
              TOTAL             2
QUILIST     *RSF S            2  100.00      .00       .00
              TOTAL             2
QUIOPEN     *RSF S            2  100.00      .00       .00
              TOTAL             2
QMHLOGER    *WS  A            1  100.00      .00       .00
              TOTAL             1
QSPHNMLT    *RSF S            1  100.00      .00       .00
              TOTAL             1
QSYACCIP    *RSF S            1  100.00      .00       .00
              TOTAL             1
QTOASND     *RSF S            1  100.00      .00       .00
              TOTAL             1
QUIALIST    *RSF S            1  100.00      .00       .00
              TOTAL             1
QUIVPMGR    *RSF S            1  100.00      .00       .00
              TOTAL             1
QWCSHUIC    *RSF S            1  100.00      .00       .00


08/02/96  18:58:07      Program IO Type Detail      PAGE   11
Program     PDIO            PDIO      PCT      PCT   PCT PGM
            Oper            Count     Pgm      ALL   IO of
                                      IO       IO    ALL IO
              TOTAL             1
QWPPUT      *RSF S            1  100.00      .00       .00
              TOTAL             1

                                                        MO5
QWTMEPJP    *RSF S            1  100.00      .00       .00
              TOTAL             1
              FINAL TOTALS
              TOTAL        94,651
* * *  E N D  O F  R E P O R T  * * *
```

Figure 98 (Part 5 of 5). Program IO Type Detail

10.2.21 Report Title - I/O by Object Name within Program within Job

This report is produced from Command Option - By Job/**PGM/Objname.

```
                    IO by Object Name within Program within Job
                  QUERY NAME . . . . . JPNOBJ08
                  LIBRARY NAME . . . . SMTRACE
                  FILE         LIBRARY      MEMBER       FORMAT
                  JPNOBJ07     PFREXP2      PEXTRACE     JPNOBJ07
                  TASKINFO     PFREXP2      PEXTRACE     TASKINFO
                  DATE . . . . . . . . 08/02/96
                  TIME . . . . . . . . 18:58:45
                         Job/Pgm IO by Object Name - Part 9
```

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE    1
Process    Job        Job    Program    Object                    PDIO          PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper          Count    Job      ALL
                                                                                         IO       IO
TSTIOC     A960126A   053543 TESTIO     DSPOBJD   DSPOBJD    0B90 *RX  A      11,969   53.72    12.65
                             TESTIO     DSPOBJD   DSPOBJD    0B90 *RSF S       1,455    6.53     1.54
                             TESTIO     DSPOBJD   DSPOBJD    0B90 *RS  A       1,370    6.15     1.45
                             TESTIO     TESTIO               0201 *RSF S         998    4.48     1.05
                             TESTIO     *DESTROYED           0000 *RS  S         745    3.34      .79
                             TESTIO     DSPOBJD   DSPOBJD    0B90 *RS  S         473    2.12      .50
                             TESTIO     QDBGETM              0201 *RSF S         447    2.01      .47
                             TESTIO     DSPOBJD              1901 *RSF S         385    1.73      .41
                             TESTIO     F86D14F54004         0000 *RSF S         354    1.59      .37
                             TESTIO     *DESTROYED           0000 *RSF S          99     .44      .10
                             TESTIO     SEIZE LOCK RANGE     0000 *RSF S          25     .11      .03
                             TESTIO     QWCBT01              19D0 *RSF S           1     .00      .00
                             TESTIO     TESTIOC              0201 *RSF S           1     .00      .00
                             TESTIOC    HATT                 0401 *RSF S       1,246    5.59     1.32
                             TESTIOC    TESTIO               0201 *RSF S         931    4.18      .98
                             TESTIOC    TESTIOC              0201 *RSF S         861    3.86      .91
                             TESTIOC    QDFTOWN              0801 *RSF S         404    1.81      .43
                             TESTIOC    QCAWAREA             19EF *RSF S         367    1.65      .39
                             TESTIOC    QRNXIE               0203 *RSF S         112     .50      .12
                             TESTIOC    QCAPLIST             19EF *RSF S           4     .02      .00
                             TESTIOC    QCAPLIST             19FC *RSF S           4     .02      .00
                             TESTIOC    QCAWAREA             19FC *RSF S           4     .02      .00
                             TESTIOC    QLDA                 19CE *RSF S           3     .01      .00
                             QCLCLCPR   TESTIOC              0201 *RSF S           9     .04      .01
                             QCLCLCPR   QSYS                 0401 *RSF S           3     .01      .00
                             QCLCLCPR   QUSRSYS              0401 *RSF S           2     .01      .00
                             TOPOFSTACK D1EDE9BC4700         0000 *RSF S           2     .01      .00
                             TOPOFSTACK QWCDLYJB             0201 *RSF S           2     .01      .00
                             TOPOFSTACK QWTPMHDJ             0201 *RSF S           1     .00      .00
                             QCADRV     QCAPLIST             19FC *RSF S           2     .01      .00
                             QCARULE    QCAWAREA             19FC *RSF S           2     .01      .00
                                                                      TOTAL     22,281
ILEAGNEW   A960126A   053541 ILEAGNEW   FCFA2024DA00         0000 *RSF S       4,353   22.17     4.60
                             ILEAGNEW   ILEAGNEW  A960126A  1AEF *RSF S       3,636   18.51     3.84
```

Figure 99 (Part 1 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE    2
Process    Job        Job    Program    Object                    PDIO           PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper           Count    Job      ALL
                                                                                          IO       IO
ILEAGNEW   A960126A   053541 ILEAGNEW   *DESTROYED           0000 *RSF S         2,063   10.50     2.18
                             ILEAGNEW   ILEAGN               0201 *RSF S         1,181    6.01     1.25
                             ILEAGNEW   QRNXDUMP             0203 *RSF S         1,012    5.15     1.07
                             ILEAGNEW   QSQENDAG             0201 *RSF S           833    4.24      .88
                             ILEAGNEW   QLEAWI               0203 *RSF S           828    4.22      .87
                             ILEAGNEW   D7A7822472O0         0000 *RSF S           730    3.72      .77
                             ILEAGNEW   ILEAGNEW             0201 *RSF S           558    2.84      .59
                             ILEAGNEW   QUIRCLAP             0201 *RS  S           551    2.81      .58
                             ILEAGNEW   QWVPDAGE             0201 *RS  S           550    2.80      .58
                             ILEAGNEW   APLIST               19EF *RSF S           281    1.43      .30
                             ILEAGNEW   D56C3B528FO0         0000 *RSF S           280    1.43      .30
                             ILEAGNEW   QCAWAREA             19EF *RSF S           276    1.41      .29
                             ILEAGNEW   QJOBMSGQ             18A0 *RSF S           274    1.40      .29
                             ILEAGNEW   SEIZE LOCK RANGE     0000 *RSF S           272    1.38      .29
                             ILEAGNEW   QRNXIE               0203 *RSF S           160     .81      .17
                             ILEAGNEW   QUSRSYS              0401 *RSF S           152     .77      .16
                             ILEAGNEW   C3E62C036OO4         0000 *RSF S           113     .58      .12
                             ILEAGNEW   QWVPDAGE             0201 *RSF S            25     .13      .03
                             ILEAGNEW   ILEAGNEW  A960126A  1AEF *RS  S            16     .08      .02
                             ILEAGNEW   QCAPLIST             19EF *RSF S             4     .02      .00
                             ILEAGNEW   QCAWAREA             19FC *RSF S             4     .02      .00
                             ILEAGNEW   QCAPLIST             19FC *RSF S             3     .02      .00
                             ILEAGNEW   QLDA                 19CE *RSF S             3     .02      .00
                             ILEAGNEW   *SECTOR I/O          0000 *WS  S             1     .01      .00
                             ILEAGNEW   QJOBMSGQ             18A0 *WS  S             1     .01      .00
                             ILEAGNEW   SM PERM DIR SEGMENT  0000 *RSF S             1     .01      .00
                             ILEAGN     C3E62C036OO4         0000 *RSF S           510    2.60      .54
                             ILEAGN     ILEAGNEW  A960126A  1AEF *RSF S           454    2.31      .48
                             ILEAGN     ILEAGN               0201 *RSF S           280    1.43      .30
                             ILEAGN     FCFA2O24DAOO         0000 *RSF S           184     .94      .19
                             QWCDLYJB   ILEAGNEW  A960126A  1AEF *WSP S             9     .05      .01
                             QWCDLYJB   QWCDLYJB             0201 *RSF S             6     .03      .01
                             QWCDLYJB                        0000 *RSF S             2     .01      .00
                             QWCDLYJB   QO4079NOO1QSPL       0DEF *WSP S             1     .01      .00
                             QCLCLCPR   ILEAGNEW             0201 *RSF S             9     .05      .01
                             QCLCLCPR   D7A782247200         0000 *RSF S             2     .01      .00

08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE    3
Process    Job        Job    Program    Object                    PDIO           PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper           Count    Job      ALL
                                                                                          IO       IO
ILEAGNEW   A960126A   053541 QCLCLCPR   ILEAGNEW  A960126A  1AEF *RS  S             1     .01      .00
                             QCLCLCPR   QUSRSYS              0401 *RSF S             1     .01      .00
                             TOPOFSTACK FCFA2O24DAOO         0000 *RSF S             6     .03      .01
                             TOPOFSTACK QWCDLYJB             0201 *RS  S             4     .02      .00
                             TOPOFSTACK D1EDE9BC47OO         0000 *RSF S             2     .01      .00
                             TOPOFSTACK ILEAGNEW  A960126A  1AEF *RS  S             1     .01      .00
                             QCADRV     QCAIFLD              0201 *RS  S             4     .02      .00
                             QCARULE    QSYS                 0401 *RSF S             2     .01      .00
                                                                      TOTAL       19,639
OPENBAD    A960126A   053546 OPEN5      *DESTROYED           0000 *RS  S         1,856    9.46     1.96
                             OPEN5      OPEN5                0201 *RSF S         1,810    9.23     1.91
                             OPEN5      *DESTROYED           0000 *RSF S         1,789    9.12     1.89
                             OPEN5      OPENBAD   A960126A  1AEF *RSF S           963    4.91     1.02
                             OPEN5      SEIZE LOCK RANGE     0000 *RSF S           728    3.71      .77
                             OPEN5      PF04      PF04       0B90 *RSF S           545    2.78      .58
                             OPEN5      PF03      PF03       0B90 *RSF S           522    2.66      .55
                             OPEN5      PF05      PF05       0B90 *RSF S           509    2.59      .54
                             OPEN5      PF02      PF02       0B90 *RSF S           495    2.52      .52
                             OPEN5      F5075E554OO4         0000 *RSF S           493    2.51      .52
                             OPEN5      FD3057655OO4         0000 *RSF S           490    2.50      .52
                             OPEN5      C2E7BB3D7OO4         0000 *RSF S           480    2.45      .51
                             OPEN5      D3334BC4OOO4         0000 *RSF S           469    2.39      .50
                             OPEN5      PF01      PF01       0B90 *RSF S           469    2.39      .50
                             OPEN5      F3CA6CD12OO4         0000 *RSF S           457    2.33      .48
                             OPEN5      PF03      PF03       0B90 *RS  A           322    1.64      .34
                             OPEN5      PF01      PF01       0B90 *RS  A           319    1.63      .34
                             OPEN5      PF01      PF01       0B90 *RS  S           319    1.63      .34
                             OPEN5      PF02      PF02       0B90 *RS  A           319    1.63      .34
                             OPEN5      PF02      PF02       0B90 *RS  S           318    1.62      .34
                             OPEN5      PF05      PF05       0B90 *RS  A           318    1.62      .34
                             OPEN5      PF03      PF03       0B90 *RS  S           317    1.62      .33
                             OPEN5      PF04      PF04       0B90 *RS  A           317    1.62      .33
                             OPEN5      PF05      PF05       0B90 *RS  S           317    1.62      .33
                             OPEN5      PF04      PF04       0B90 *RS  S           316    1.61      .33
```

Figure 99 (Part 2 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE    4
Process    Job        Job    Program    Object                    PDIO          PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper          Count    Job      ALL
                                                                                         IO       IO
OPENBAD    A960126A   053546 OPEN5      PF01                1901 *RSF S           308   1.57     .33
                             OPEN5      PF02                1901 *RSF S           308   1.57     .33
                             OPEN5      PF05                1901 *RSF S           306   1.56     .32
                             OPEN5      PF04                1901 *RSF S           305   1.55     .32
                             OPEN5      PF03                1901 *RSF S           304   1.55     .32
                             OPEN5      OPENBAD   A960126A  1AEF *RS  S            13    .07     .01
                             OPEN5      OPENBAD             0201 *RSF S             5    .03     .01
                             OPEN5      QWCBT01             19D0 *RSF S             5    .03     .01
                             OPEN5      SM PERM DIR SEGMENT 0000 *RSF S             1    .01     .00
                             OPENBAD    OPENBAD             0201 *RSF S           933   4.76     .99
                             OPENBAD    QCAWAREA            19EF *RSF S           610   3.11     .64
                             OPENBAD    OPEN5               0201 *RSF S           575   2.93     .61
                             OPENBAD    QUSRSYS             0401 *RSF S           257   1.31     .27
                             OPENBAD    OPENBAD   A960126A  1AEF *RSF S           224   1.14     .24
                             OPENBAD    QRNXIE              0203 *RSF S            24    .12     .03
                             OPENBAD    FE38ECDB8004        0000 *RSF S            15    .08     .02
                             OPENBAD    QCAPLIST            19FC *RSF S            14    .07     .01
                             OPENBAD    QCAPLIST            19EF *RSF S            13    .07     .01
                             OPENBAD    QCAWAREA            19FC *RSF S            13    .07     .01
                             OPENBAD    QLDA                19CE *RSF S             8    .04     .01
                             OPENBAD    OPENBAD   A960126A  1AEF *RS  S             6    .03     .01
                             OPENBAD    SM PERM DIR SEGMENT 0000 *RSF S             1    .01     .00
                             QCLCLCPR   OPENBAD             0201 *RSF S            24    .12     .03
                             QCLCLCPR   QCAWAREA            19EF *RSF S             8    .04     .01
                             QCLCLCPR   QUSRSYS             0401 *RSF S             8    .04     .01
                             QCLCLCPR   SM PERM DIR SEGMENT 0000 *RSF S             1    .01     .00
                             TOPOFSTACK FE38ECDB8004        0000 *RSF S            14    .07     .01
                             TOPOFSTACK QCAPLIST            19EF *RSF S             7    .04     .01
                             TOPOFSTACK OPENBAD   A960126A  1AEF *RS  S             4    .02     .00
                             TOPOFSTACK OPENBAD             0201 *RSF S             3    .02     .00
                             TOPOFSTACK QWCDLYJB            0201 *RS  S             2    .01     .00
                             TOPOFSTACK QWCDLYJB            0201 *RSF S             2    .01     .00
                             TOPOFSTACK D1EDE9BC4700        0000 *RSF S             1    .01     .00
                             TOPOFSTACK QWTPMHDJ            0201 *RSF S             1    .01     .00
                             QWCDLYJB   OPENBAD   A960126A  1AEF *WSP S            16    .08     .02
                             QWCDLYJB                       0000 *RSF S             6    .03     .01

08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE    5
Process    Job        Job    Program    Object                    PDIO          PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper          Count    Job      ALL
                                                                                         IO       IO
OPENBAD    A960126A   053546 QWCDLYJB   QWCDLYJB            0201 *RSF S             1    .01     .00
                             QCARULE    QCAWAREA            19FC *RSF S             7    .04     .01
                             QCARULE    QSYS                0401 *RSF S             1    .01     .00
                             QCADRV     QCAWAREA            19EF *RSF S             3    .02     .00
                             QCADRV     QCAIFLD             0201 *RS  S             2    .01     .00
                                                                  TOTAL        19,616
JUNK       QSPLJOB    053464 QCMDEXC    D2FB76C77200        0000 *RSF S           650  12.51     .69
                             QCMDEXC    JUNK      QSPLJOB   1AEF *RSF S           462   8.89     .49
                             QCMDEXC    QSOSRV2             0203 *RSF S           291   5.60     .31
                             QCMDEXC    QTMPLPRC            0201 *RSF S           220   4.23     .23
                             QCMDEXC    QSOKERN3            0203 *RSF S           214   4.12     .23
                             QCMDEXC    *DESTROYED          0000 *RSF S           193   3.72     .20
                             QCMDEXC    L/L RANGE 1         0000 *RSF S           164   3.16     .17
                             QCMDEXC    QSOSRV1             0203 *RSF S           143   2.75     .15
                             QCMDEXC    CB409AF8A004        0000 *RSF S            84   1.62     .09
                             QCMDEXC    F4E3FAD8D004        0000 *RSF S            84   1.62     .09
                             QCMDEXC    QTQICONV            0203 *RSF S            81   1.56     .09
                             QCMDEXC    E7CB3ED36004        0000 *RSF S            72   1.39     .08
                             QCMDEXC    QPOLLIB1            0203 *RSF S            72   1.39     .08
                             QCMDEXC    E43BF962E500        0000 *RSF S            69   1.33     .07
                             QCMDEXC    QYPPRT              0203 *RSF S            66   1.27     .07
                             QCMDEXC    QSO_DNS_INDEX       0EEF *RSF S            60   1.15     .06
                             QCMDEXC    QC2UTIL1            0203 *RSF S            54   1.04     .06
                             QCMDEXC    F836A3DBEA00        0000 *RSF S            50    .96     .05
                             QCMDEXC    QPOSSRV3            0203 *RSF S            45    .87     .05
                             QCMDEXC    JUNK      QSPLJOB   1AEF *RS  S            41    .79     .04
                             QCMDEXC    QTQICVC2            0203 *RSF S            38    .73     .04
                             QCMDEXC    QPOLLFS1            0203 *RSF S            36    .69     .04
                             QCMDEXC    ECB9E6FE0E00        0000 *RSF S            32    .62     .03
                             QCMDEXC    QPOLDC1             0203 *RSF S            32    .62     .03
                             QCMDEXC    QPOSSRV4            0203 *RSF S            26    .50     .03
                             QCMDEXC    QPOWPID             0203 *RSF S            26    .50     .03
                             QCMDEXC    QPOWPIDI            0203 *RSF S            26    .50     .03
                             QCMDEXC    QWPZHPT1            0203 *RSF S            26    .50     .03
```

Figure 99 (Part 3 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE    6
Process    Job        Job    Program    Object                    PDIO           PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper           Count    Job      ALL
                                                                                          IO       IO
JUNK       QSPLJOB    053464 QCMDEXC    QJOBMSGQ             18A0 *RSF S            25    .48      .03
                             QCMDEXC    D1EDE9BC4700         0000 *RSF S            24    .46      .03
                             QCMDEXC    QTQSRVP2             0203 *RSF S            24    .46      .03
                             QCMDEXC    QSECOFR              0801 *RSF S            15    .29      .02
                             QCMDEXC    EEE05252CB00         0000 *RSF S            14    .27      .01
                             QCMDEXC    FCAE1490 9A00        0000 *RSF S            14    .27      .01
                             QCMDEXC    C517F58CA900         0000 *RSF S            12    .23      .01
                             QCMDEXC    QCACHLBL             0201 *RS  S            12    .23      .01
                             QCMDEXC    QCAIEXIT             0201 *RS  S            12    .23      .01
                             QCMDEXC    QMHRSNEM             0201 *RSF S            12    .23      .01
                             QCMDEXC    QSYS                 0401 *RSF S            12    .23      .01
                             QCMDEXC    QWCDLYJB             0201 *RS  S            12    .23      .01
                             QCMDEXC    SQCCSID1             0ED2 *RSF S            12    .23      .01
                             QCMDEXC    QLEAWI               0203 *RSF S             9    .17      .01
                             QCMDEXC    D4857675 6100        0000 *RSF S             6    .12      .01
                             QCMDEXC    QCASQ                0AEF *RSF S             6    .12      .01
                             QCMDEXC    QC2IO                0203 *RSF S             6    .12      .01
                             QCMDEXC    QTCP                 0401 *RSF S             6    .12      .01
                             QCMDEXC    QWVPDAGE             0201 *RS  S             6    .12      .01
                             QDMCOPEN   D2FB76C7720O         0000 *RSF S           101   1.94     .11
                             QDMCOPEN   QSOSRV2              0203 *RSF S            80   1.54     .08
                             QDMCOPEN   JUNK      QSPLJOB    1AEF *RSF S            35    .67      .04
                             QDMCOPEN   QUSRSYS              0401 *RSF S            30    .58      .03
                             QDMCOPEN   QSECOFR              0801 *RSF S            28    .54      .03
                             QDMCOPEN   EEE05252CB00         0000 *RSF S            19    .37      .02
                             QDMCOPEN   QATOCTCPIP           1901 *RSF S            17    .33      .02
                             QDMCOPEN   QC2IO                0203 *RSF S             6    .12      .01
                             QDMCOPEN   QWCBT01              19D0 *RSF S             2    .04      .00
                             QDMCOPEN   QTMPLPRC             0201 *RSF S             1    .02      .00
                             QDBOPEN    SQCCSID1             0ED2 *RSF S            74   1.42     .08
                             QDBOPEN    SEIZE LOCK RANGE     0000 *RSF S            38    .73      .04
                             QDBOPEN    JUNK      QSPLJOB    1AEF *RSF S            34    .65      .04
                             QDBOPEN    QDBOPEN              0201 *RSF S            27    .52      .03
                             QDBOPEN    QTMPLPRC             0201 *RSF S            25    .48      .03
                             QDBOPEN    FC64411FC004         0000 *RSF S            17    .33      .02
                             QDBOPEN    QATOCTCPIPCONFIG     0B90 *RSF S            17    .33      .02

08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE    7
Process    Job        Job    Program    Object                    PDIO           PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper           Count    Job      ALL
                                                                                          IO       IO
JUNK       QSPLJOB    053464 QDBOPEN    QATOCTCPIPCONFIG     0C90 *RSF S            16    .31      .02
                             QDBOPEN    QATTR                1951 *RSF S            13    .25      .01
                             QDBOPEN    *DESTROYED           0000 *RSF S             6    .12      .01
                             QDBOPEN    JUNK      QSPLJOB    1AEF *RS  S             3    .06      .00
                             QDBGETKY   QATOCTCPIPCONFIG     0C90 *RSF S            39    .75      .04
                             QDBGETKY   F5428E447004         0000 *RSF S            25    .48      .03
                             QDBGETKY   L/L RANGE 1          0000 *RSF S            24    .46      .03
                             QDBGETKY   QATOCTCPIPCONFIG     0B90 *RSF S            23    .44      .02
                             QDBGETKY   QATOCTCPIPCONFIG     0B90 *RS  S            17    .33      .02
                             QDBGETKY   JUNK      QSPLJOB    1AEF *RSF S            16    .31      .02
                             QDBGETKY   FC64411FC004         0000 *RSF S            12    .23      .01
                             QDBGETKY   QATOCPS    SERVICES  0B90 *RS  A            12    .23      .01
                             QDBGETKY   QATOCPS    SERVICES  0B90 *RS  S            12    .23      .01
                             QDBGETKY   *DESTROYED           0000 *RSF S             4    .08      .00
                             QMHSNDPM   QJOBMSGQ             18A0 *RSF S            47    .90      .05
                             QMHSNDPM   QTCPMSGF             0E03 *RSF S            30    .58      .03
                             QMHSNDPM   QCPFMSG              0E03 *RSF S            26    .50      .03
                             QMHSNDPM   QTCP                 0401 *RSF S            18    .35      .02
                             QMHSNDPM   EEE05252CB00         0000 *RSF S             6    .12      .01
                             QMHSNDPM   QUSDLTUS             0201 *RSF S             6    .12      .01
                             QMHSNDPM   D2FB76C7720O         0000 *RSF S             5    .10      .01
                             QMHSNDPM   JUNK      QSPLJOB    1AEF *RSF S             4    .08      .00
                             QMHSNDPM   E7CB3ED36004         0000 *RSF S             1    .02      .00
                             QMHSNDPM   JUNK      QSPLJOB    1AEF *RS  S             1    .02      .00
                             TOPOFSTACK QSPRMTDR             0201 *RSF S            26    .50      .03
                             TOPOFSTACK JUNK      QSPLJOB    1AEF *RSF S            21    .40      .02
                             TOPOFSTACK QC2UTIL1             0203 *RSF S            18    .35      .02
                             TOPOFSTACK D2FB76C7720O         0000 *RSF S            13    .25      .01
                             TOPOFSTACK JUNK      QSPLJOB    1AEF *RS  S            10    .19      .01
                             TOPOFSTACK QJOBMSGQ             18A0 *RSF S             2    .04      .00
                             TOPOFSTACK E7CB3ED36004         0000 *RSF S             1    .02      .00
                             QMHRSNEM   QSPRMTDR             0201 *RSF S            18    .35      .02
                             QMHRSNEM   QMHRSNEM             0201 *RSF S            12    .23      .01
                             QMHRSNEM   EEE05252CB00         0000 *RSF S             9    .17      .01
                             QMHRSNEM   D2FB76C7720O         0000 *RSF S             6    .12      .01
                             QMHRSNEM   JUNK      QSPLJOB    1AEF *RSF S             6    .12      .01
```

Figure 99 (Part 4 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE    8
Process    Job       Job    Program   Object                    PDIO          PDIO     PCT      PCT
job name   user      number           Name/Type                 Oper          Count    Job      ALL
                                                                                       IO       IO
JUNK       QSPLJOB   053464 QMHRSNEM  QJOBMSGQ            18A0 *RSF S            6    .12      .01
                            QMHRSNEM  E7CB3ED36O04        0000 *RSF S            3    .06      .00
                            QMHRSNEM  QTMPLPRC            0201 *RSF S            1    .02      .00
                            QLIDLOBJ  QJOBMSGQ            18A0 *RSF S           17    .33      .02
                            QLIDLOBJ  E7CB3ED36O04        0000 *RSF S           12    .23      .01
                            QLIDLOBJ  D2FB76C772OO        0000 *RSF S            6    .12      .01
                            QLIDLOBJ  EEEO5252CBOO        0000 *RSF S            6    .12      .01
                            QLIDLOBJ  JUNK      QSPLJOB   1AEF *RSF S            6    .12      .01
                            QLIDLOBJ  QLIDLOBJ            0201 *RSF S            6    .12      .01
                            QCATRS    QTCP                0401 *RSF S           14    .27      .01
                            QCATRS    QTMPCKP             0201 *RSF S           14    .27      .01
                            QCATRS    QTMPLPRC            0201 *RSF S           12    .23      .01
                            QDMCLOSE  FC64411FCO04        0000 *RSF S           12    .23      .01
                            QDMCLOSE  QATOCTCPIPCONFIG    0B90 *RSF S           12    .23      .01
                            QDMCLOSE  QATOCTCPIPCONFIG    0C90 *RSF S           12    .23      .01
                            QMHMOVPM  QJOBMSGQ            18A0 *RSF S           25    .48      .03
                            QMHMOVPM  D2624DD3FO04        0000 *RSF S            6    .12      .01
                            QMHMOVPM  JUNK      QSPLJOB   1AEF *RSF S            4    .08      .00
                            QMHMOVPM  E7CB3ED36O04        0000 *RSF S            1    .02      .00
                            QSQENDAG  JUNK      QSPLJOB   1AEF *RSF S           20    .38      .02
                            QSQENDAG  D2FB76C772OO        0000 *RSF S            6    .12      .01
                            QSQENDAG  EEEO5252CBOO        0000 *RSF S            6    .12      .01
                            QSQENDAG  QJOBMSGQ            18A0 *RSF S            2    .04      .00
                            QSQENDAG  QSQENDAG            0201 *RSF S            2    .04      .00
                            QLICHLLE  QLICHLLE            0201 *RSF S           13    .25      .01
                            QLICHLLE  SEIZE LOCK RANGE    0000 *RSF S           12    .23      .01
                            QLICHLLE  QTCP                0401 *RSF S            7    .13      .01
                            QWCDLYJB  JUNK      QSPLJOB   1AEF *WS  S           12    .23      .01
                            QWCDLYJB  *DESTROYED          0000 *RSF S            6    .12      .01
                            QWCDLYJB  JUNK      QSPLJOB   1AEF *WSP S            6    .12      .01
                            QWCDLYJB  QWCDLYJB            0201 *RSF S            6    .12      .01
                            QWCDLYJB  JUNK      QSPLJOB   1AEF *RS  S            1    .02      .00
                            QCANPARS  SQCCSID1            0ED2 *RSF S           24    .46      .03
                            QCANPARS  SEIZE LOCK RANGE    0000 *RSF S            6    .12      .01
                            QCADRV2   QLICHLLE            0201 *RS  S           14    .27      .01
                            QCADRV2   QCAIFLD             0201 *RS  S           12    .23      .01

08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE    9
Process    Job       Job    Program   Object                    PDIO          PDIO     PCT      PCT
job name   user      number           Name/Type                 Oper          Count    Job      ALL
                                                                                       IO       IO
JUNK       QSPLJOB   053464 QCADRV2   JUNK      QSPLJOB   1AEF *RSF S            2    .04      .00
                            QCADRV2   SEIZE LOCK RANGE    0000 *RSF S            1    .02      .00
                            QMHPDEH   QJOBMSGQ            18A0 *RSF S           15    .29      .02
                            QMHPDEH   JUNK      QSPLJOB   1AEF *RSF S           12    .23      .01
                            QCACHLBL  QLICHLLE            0201 *RS  S           12    .23      .01
                            QCACHLBL  *DESTROYED          0000 *RSF S            6    .12      .01
                            QCACHLBL  QCACHLBL            0201 *RSF S            6    .12      .01
                            QCACHLBL  SEIZE LOCK RANGE    0000 *RSF S            1    .02      .00
                            QCAIEXIT  *DESTROYED          0000 *RSF S           12    .23      .01
                            QCAIEXIT  QCAIEXIT            0201 *RSF S            6    .12      .01
                            QCAIEXIT  QSECOFR             0801 *RSF S            6    .12      .01
                            QCAIEXIT  SEIZE LOCK RANGE    0000 *RSF S            1    .02      .00
                            QUSRJOBI  JUNK      QSPLJOB   1AEF *RSF S           16    .31      .02
                            QUSRJOBI  QSPSCB              19C2 *RSF S            6    .12      .01
                            QMHCHGEM  JUNK      QSPLJOB   1AEF *RSF S            6    .12      .01
                            QMHCHGEM  QSPRMTDR            0201 *RSF S            6    .12      .01
                            QMHCHGEM  EEEO5252CBOO        0000 *RSF S            1    .02      .00
                            QMHCHGEM  QTMPLPRC            0201 *RSF S            1    .02      .00
                            QDBCLOSE  *DESTROYED          0000 *RSF S           12    .23      .01
                            QDBCLOSE  SEIZE LOCK RANGE    0000 *RSF S            1    .02      .00
                            QUSDLTUS  JUNK      QSPLJOB   1AEF *RSF S            7    .13      .01
                            QUSDLTUS  QTMPLPRC            0201 *RSF S            6    .12      .01
                            QDCXLATE  JUNK      QSPLJOB   1AEF *RSF S            6    .12      .01
                            QDCXLATE  QTCPASC             1906 *RSF S            6    .12      .01
                            QDMRCLSE  QSQENDAG            0201 *RSF S            5    .10      .01
                            QDMRCLSE  QUIRCLAP            0201 *RS  S            5    .10      .01
                            QDMRCLSE  JUNK      QSPLJOB   1AEF *RSF S            1    .02      .00
                            QMHRCVPM  JUNK      QSPLJOB   1AEF *RSF S            8    .15      .01
                            QTMPCKP   QTMPCKP             0201 *RSF S            7    .13      .01
                            QCARULE   QSYS                0401 *RSF S            6    .12      .01
                            QLICNV    JUNK      QSPLJOB   1AEF *RSF S            6    .12      .01
                            QMHRTMSS  JUNK      QSPLJOB   1AEF *RSF S            6    .12      .01
                            QTQGESP   JUNK      QSPLJOB   1AEF *RSF S            6    .12      .01
                            QUIRCLAP  JUNK      QSPLJOB   1AEF *RSF S            4    .08      .00
                            QCAIFLD   JUNK      QSPLJOB   1AEF *RSF S            2    .04      .00
```

Figure 99 (Part 5 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   10
Process    Job        Job    Program    Object                   PDIO           PDIO     PCT      PCT
job name   user       number            Name/Type                Oper           Count    Job      ALL
                                                                                         IO       IO

                                                                   TOTAL         5,195
                          TOPOFSTACK ILEAGNEW  A960126A   1AEF *WSP S           673  17.12      .71
                          TOPOFSTACK *DESTROYED           0000 *WSP S           532  13.53      .56
                          TOPOFSTACK FCFA2024DA00         0000 *WSP S           523  13.30      .55
                          TOPOFSTACK SEIZE LOCK RANGE     0000 *WSP S           185   4.70      .20
                          TOPOFSTACK QCAWAREA             19EF *WSP S           157   3.99      .17
                          TOPOFSTACK OPENBAD   A960126A   1AEF *WSP S           114   2.90      .12
                          TOPOFSTACK C3E62C036004         0000 *WSP S           113   2.87      .12
                          TOPOFSTACK F5075E554004         0000 *WSP S           100   2.54      .11
                          TOPOFSTACK F86D14F54004         0000 *WSP S            95   2.42      .10
                          TOPOFSTACK F3CA6CD12004         0000 *WSP S            93   2.37      .10
                          TOPOFSTACK PF05      PF05       0B90 *WSP S            92   2.34      .10
                          TOPOFSTACK FD3057655004         0000 *WSP S            87   2.21      .09
                          TOPOFSTACK PF04      PF04       0B90 *WSP S            85   2.16      .09
                          TOPOFSTACK QJOBMSGQ             18A0 *WSP S            84   2.14      .09
                          TOPOFSTACK D3334BC40004         0000 *WSP S            83   2.11      .09
                          TOPOFSTACK JUNK      QSPLJOB    1AEF *WSP S            83   2.11      .09
                          TOPOFSTACK PF01      PF01       0B90 *WSP S            81   2.06      .09
                          TOPOFSTACK DSPOBJD   DSPOBJD    0B90 *WSP S            80   2.03      .08
                          TOPOFSTACK PF03      PF03       0B90 *WSP S            79   2.01      .08
                          TOPOFSTACK PF02      PF02       0B90 *WSP S            77   1.96      .08
                          TOPOFSTACK C2E7BB3D7004         0000 *WSP S            76   1.93      .08
                          TOPOFSTACK QRNXDUMP             0203 *WSP S            58   1.48      .06
                          TOPOFSTACK QRNXIE               0203 *WSP S            57   1.45      .06
                          TOPOFSTACK TESTIO               0201 *WSP S            52   1.32      .05
                          TOPOFSTACK OPEN5                0201 *WSP S            47   1.20      .05
                          TOPOFSTACK ILEAGN               0201 *WSP S            41   1.04      .04
                          TOPOFSTACK D2FB76C7720O         0000 *WSP S            39    .99      .04
                          TOPOFSTACK D56C3B528F0O         0000 *WSP S            37    .94      .04
                          TOPOFSTACK D7A7822472O0         0000 *WSP S            33    .84      .03
                          TOPOFSTACK E7CB3ED36004         0000 *WSP S            11    .28      .01
                          TOPOFSTACK D1EDE9BC470O         0000 *WSP S             6    .15      .01
                          TOPOFSTACK E43BF962E50O         0000 *WSP S             6    .15      .01
                          TOPOFSTACK FC64411FC004         0000 *WSP S             6    .15      .01
                          TOPOFSTACK QCAWAREA             19FC *WSP S             6    .15      .01

08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   11
Process    Job        Job    Program    Object                   PDIO           PDIO     PCT      PCT
job name   user       number            Name/Type                Oper           Count    Job      ALL
                                                                                         IO       IO
                          TOPOFSTACK SQCCSID1             0ED2 *WSP S             6    .15      .01
                          TOPOFSTACK QATOCTCPIPCONFIG     0C90 *WSP S             5    .13      .01
                          TOPOFSTACK FE38ECDB8004         0000 *WSP S             4    .10      .00
                          TOPOFSTACK QATOCTCPIPCONFIG     0B90 *WSP S             4    .10      .00
                          TOPOFSTACK QCAPLIST             19EF *WSP S             3    .08      .00
                          TOPOFSTACK QCAPLIST             19FC *WSP S             3    .08      .00
                          TOPOFSTACK FCAE14909A00         0000 *WSP S             2    .05      .00
                          TOPOFSTACK F5428E447004         0000 *WSP S             2    .05      .00
                          TOPOFSTACK QCASQ                0AEF *WSP S             2    .05      .00
                          TOPOFSTACK ECB9E6FE0E00         0000 *WSP S             1    .03      .00
                          TOPOFSTACK EEE05252CB00         0000 *WSP S             1    .03      .00
                          TOPOFSTACK F836A3DBEA00         0000 *WSP S             1    .03      .00
                          TOPOFSTACK QPOLLIB1             0203 *WSP S             1    .03      .00
                          TOPOFSTACK QPOSSRV3             0203 *WSP S             1    .03      .00
                          TOPOFSTACK QSO_DNS_INDEX        0EEF *WSP S             1    .03      .00
                          TOPOFSTACK QTCP                 0401 *WSP S             1    .03      .00
                          TOPOFSTACK QTCPMSGF             0E03 *WSP S             1    .03      .00
                          TOPOFSTACK QTMPLPRC             0201 *WSP S             1    .03      .00
                          TOPOFSTACK QYPPRT               0203 *WSP S             1    .03      .00
                          TOPOFSTACK ILEAGNEW  A960126A   1AEF *WSP S           665  17.26      .70
                          TOPOFSTACK *DESTROYED           0000 *WSP S           509  13.21      .54
                          TOPOFSTACK FCFA2024DA00         0000 *WSP S           474  12.30      .50
                          TOPOFSTACK SEIZE LOCK RANGE     0000 *WSP S           164   4.26      .17
                          TOPOFSTACK QCAWAREA             19EF *WSP S           146   3.79      .15
                          TOPOFSTACK OPENBAD   A960126A   1AEF *WSP S           135   3.50      .14
                          TOPOFSTACK JUNK      QSPLJOB    1AEF *WSP S           110   2.85      .12
                          TOPOFSTACK C3E62C036004         0000 *WSP S            96   2.49      .10
                          TOPOFSTACK QJOBMSGQ             18A0 *WSP S            90   2.34      .10
                          TOPOFSTACK PF03      PF03       0B90 *WSP S            88   2.28      .09
                          TOPOFSTACK F5075E554004         0000 *WSP S            85   2.21      .09
                          TOPOFSTACK C2E7BB3D7004         0000 *WSP S            83   2.15      .09
                          TOPOFSTACK PF01      PF01       0B90 *WSP S            83   2.15      .09
                          TOPOFSTACK DSPOBJD   DSPOBJD    0B90 *WSP S            80   2.08      .08
                          TOPOFSTACK FD3057655004         0000 *WSP S            80   2.08      .08
                          TOPOFSTACK D3334BC40004         0000 *WSP S            79   2.05      .08
                          TOPOFSTACK PF04      PF04       0B90 *WSP S            79   2.05      .08
```

Figure 99 (Part 6 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   12
Process    Job        Job    Program    Object                    PDIO          PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper          Count    Job      ALL
                                                                                         IO       IO
                              TOPOFSTACK D2FB76C7720O         0000 *WSP S            77   2.00     .08
                              TOPOFSTACK F3CA6CD12OO4         0000 *WSP S            77   2.00     .08
                              TOPOFSTACK PFO2      PFO2       0B90 *WSP S            75   1.95     .08
                              TOPOFSTACK F86D14F54OO4         0000 *WSP S            71   1.84     .08
                              TOPOFSTACK PFO5      PFO5       0B90 *WSP S            66   1.71     .07
                              TOPOFSTACK QRNXDUMP             0203 *WSP S            59   1.53     .06
                              TOPOFSTACK D56C3B528FOO         0000 *WSP S            56   1.45     .06
                              TOPOFSTACK OPEN5                0201 *WSP S            54   1.40     .06
                              TOPOFSTACK TESTIO               0201 *WSP S            48   1.25     .05
                              TOPOFSTACK QRNXIE               0203 *WSP S            39   1.01     .04
                              TOPOFSTACK D7A7822472OO         0000 *WSP S            38    .99     .04
                              TOPOFSTACK ILEAGN               0201 *WSP S            37    .96     .04
                              TOPOFSTACK E43BF962E5OO         0000 *WSP S            15    .39     .02
                              TOPOFSTACK E7CB3ED36OO4         0000 *WSP S            15    .39     .02
                              TOPOFSTACK FE38ECDB8OO4         0000 *WSP S             8    .21     .01
                              TOPOFSTACK ECB9E6FEOEOO         0000 *WSP S             6    .16     .01
                              TOPOFSTACK EEEO5252CBOO         0000 *WSP S             6    .16     .01
                              TOPOFSTACK FC64411FCOO4         0000 *WSP S             5    .13     .01
                              TOPOFSTACK QATOCTCPIPCONFIG     0B90 *WSP S             5    .13     .01
                              TOPOFSTACK D1EDE9BC47OO         0000 *WSP S             4    .10     .00
                              TOPOFSTACK F836A3DBEAOO         0000 *WSP S             4    .10     .00
                              TOPOFSTACK QATOCTCPIPCONFIG     0C90 *WSP S             4    .10     .00
                              TOPOFSTACK QCAWAREA             19FC *WSP S             4    .10     .00
                              TOPOFSTACK QPOLLIB1             0203 *WSP S             4    .10     .00
                              TOPOFSTACK QSOSRV1              0203 *WSP S             4    .10     .00
                              TOPOFSTACK QYPPRT               0203 *WSP S             4    .10     .00
                              TOPOFSTACK F5428E447OO4         0000 *WSP S             3    .08     .00
                              TOPOFSTACK QCAPLIST             19FC *WSP S             3    .08     .00
                              TOPOFSTACK SQCCSID1             0ED2 *WSP S             3    .08     .00
                              TOPOFSTACK FCAE14909AOO         0000 *WSP S             2    .05     .00
                              TOPOFSTACK QCAPLIST             19EF *WSP S             2    .05     .00
                              TOPOFSTACK QPOSSRV3             0203 *WSP S             2    .05     .00
                              TOPOFSTACK QSOSRV2              0203 *WSP S             2    .05     .00
                              TOPOFSTACK QTCP                 0401 *WSP S             2    .05     .00
                              TOPOFSTACK QSO_DNS_INDEX        0EEF *WSP S             1    .03     .00
                              TOPOFSTACK QTCPMSGF             0E03 *WSP S             1    .03     .00

08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   13
Process    Job        Job    Program    Object                    PDIO          PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper          Count    Job      ALL
                                                                                         IO       IO
                              TOPOFSTACK QTQICONV             0203 *WSP S             1   .03      .00
                              TOPOFSTACK ILEAGNEW  A960126A   1AEF *WSP S           716 19.00      .76
                              TOPOFSTACK *DESTROYED           0000 *WSP S           493 13.08      .52
                              TOPOFSTACK FCFA2024DAOO         0000 *WSP S           414 10.99      .44
                              TOPOFSTACK SEIZE LOCK RANGE     0000 *WSP S           207  5.49      .22
                              TOPOFSTACK QCAWAREA             19EF *WSP S           130  3.45      .14
                              TOPOFSTACK OPENBAD   A960126A   1AEF *WSP S           127  3.37      .13
                              TOPOFSTACK C3E62CO36OO4         0000 *WSP S           111  2.95      .12
                              TOPOFSTACK JUNK      QSPLJOB    1AEF *WSP S           102  2.71      .11
                              TOPOFSTACK QJOBMSGQ             18A0 *WSP S            94  2.49      .10
                              TOPOFSTACK F86D14F54OO4         0000 *WSP S            91  2.42      .10
                              TOPOFSTACK D3334BC40OO4         0000 *WSP S            88  2.34      .09
                              TOPOFSTACK PFO5      PFO5       0B90 *WSP S            85  2.26      .09
                              TOPOFSTACK PFO3      PFO3       0B90 *WSP S            84  2.23      .09
                              TOPOFSTACK C2E7BB3D7OO4         0000 *WSP S            78  2.07      .08
                              TOPOFSTACK F5O75E554OO4         0000 *WSP S            78  2.07      .08
                              TOPOFSTACK FD3O57655OO4         0000 *WSP S            76  2.02      .08
                              TOPOFSTACK DSPOBJD   DSPOBJD    0B90 *WSP S            72  1.91      .08
                              TOPOFSTACK F3CA6CD12OO4         0000 *WSP S            69  1.83      .07
                              TOPOFSTACK PFO4      PFO4       0B90 *WSP S            69  1.83      .07
                              TOPOFSTACK PFO2      PFO2       0B90 *WSP S            65  1.73      .07
                              TOPOFSTACK QRNXDUMP             0203 *WSP S            63  1.67      .07
                              TOPOFSTACK PFO1      PFO1       0B90 *WSP S            62  1.65      .07
                              TOPOFSTACK QRNXIE               0203 *WSP S            49  1.30      .05
                              TOPOFSTACK D2FB76C7720O         0000 *WSP S            47  1.25      .05
                              TOPOFSTACK D7A7822472OO         0000 *WSP S            41  1.09      .04
                              TOPOFSTACK TESTIO               0201 *WSP S            39  1.04      .04
                              TOPOFSTACK ILEAGN               0201 *WSP S            38  1.01      .04
                              TOPOFSTACK OPEN5                0201 *WSP S            37   .98      .04
                              TOPOFSTACK D56C3B528FOO         0000 *WSP S            34   .90      .04
                              TOPOFSTACK E7CB3ED36OO4         0000 *WSP S            18   .48      .02
                              TOPOFSTACK QATOCTCPIPCONFIG     0C90 *WSP S            11   .29      .01
                              TOPOFSTACK FC64411FCOO4         0000 *WSP S             9   .24      .01
                              TOPOFSTACK D1EDE9BC47OO         0000 *WSP S             7   .19      .01
                              TOPOFSTACK QATOCTCPIPCONFIG     0B90 *WSP S             7   .19      .01
                              TOPOFSTACK FE38ECDB8OO4         0000 *WSP S             6   .16      .01
```

Figure 99 (Part 7 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   14
Process    Job        Job    Program    Object                    PDIO           PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper           Count    Job      ALL
                                                                                          IO       IO
                             TOPOFSTACK F5428E447004         0000 *WSP S             6    .16      .01
                             TOPOFSTACK QCAPLIST             19EF *WSP S             6    .16      .01
                             TOPOFSTACK E43BF962E500         0000 *WSP S             4    .11      .00
                             TOPOFSTACK F836A3DBEA00         0000 *WSP S             4    .11      .00
                             TOPOFSTACK QCAPLIST             19FC *WSP S             4    .11      .00
                             TOPOFSTACK QTQICONV             0203 *WSP S             4    .11      .00
                             TOPOFSTACK FCAE14909A00         0000 *WSP S             3    .08      .00
                             TOPOFSTACK QCAWAREA             19FC *WSP S             3    .08      .00
                             TOPOFSTACK QYPPRT               0203 *WSP S             3    .08      .00
                             TOPOFSTACK ECB9E6FE0E00         0000 *WSP S             2    .05      .00
                             TOPOFSTACK EEE05252CB00         0000 *WSP S             2    .05      .00
                             TOPOFSTACK QPOSSRV3             0203 *WSP S             2    .05      .00
                             TOPOFSTACK QTMPLPRC             0201 *WSP S             2    .05      .00
                             TOPOFSTACK SQCCSID1             0ED2 *WSP S             2    .05      .00
                             TOPOFSTACK QPOLLIB1             0203 *WSP S             1    .03      .00
                             TOPOFSTACK QSO_DNS_INDEX        0EEF *WSP S             1    .03      .00
                             TOPOFSTACK QSOSRV1              0203 *WSP S             1    .03      .00
                             TOPOFSTACK QSOSRV2              0203 *WSP S             1    .03      .00
                             TOPOFSTACK ILEAGNEW  A960126A   1AEF *WSP S           649  17.55      .69
                             TOPOFSTACK FCFA2024DA00         0000 *WSP S           502  13.57      .53
                             TOPOFSTACK *DESTROYED           0000 *WSP S           457  12.36      .48
                             TOPOFSTACK SEIZE LOCK RANGE     0000 *WSP S           169   4.57      .18
                             TOPOFSTACK QCAWAREA             19EF *WSP S           123   3.33      .13
                             TOPOFSTACK OPENBAD   A960126A   1AEF *WSP S           117   3.16      .12
                             TOPOFSTACK JUNK      QSPLJOB    1AEF *WSP S           110   2.97      .12
                             TOPOFSTACK QJOBMSGQ             18A0 *WSP S           107   2.89      .11
                             TOPOFSTACK C3E62C036004         0000 *WSP S            98   2.65      .10
                             TOPOFSTACK C2E7BB3D7004         0000 *WSP S            94   2.54      .10
                             TOPOFSTACK F86D14F54004         0000 *WSP S            94   2.54      .10
                             TOPOFSTACK F3CA6CD12004         0000 *WSP S            82   2.22      .09
                             TOPOFSTACK FD3057655004         0000 *WSP S            80   2.16      .08
                             TOPOFSTACK PF02      PF02       0B90 *WSP S            80   2.16      .08
                             TOPOFSTACK PF03      PF03       0B90 *WSP S            80   2.16      .08
                             TOPOFSTACK F5075E554004         0000 *WSP S            79   2.14      .08
                             TOPOFSTACK D3334BC40004         0000 *WSP S            75   2.03      .08
                             TOPOFSTACK PF04      PF04       0B90 *WSP S            70   1.89      .07

08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   15
Process    Job        Job    Program    Object                    PDIO           PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper           Count    Job      ALL
                                                                                          IO       IO
                             TOPOFSTACK PF05      PF05       0B90 *WSP S            68   1.84      .07
                             TOPOFSTACK PF01      PF01       0B90 *WSP S            65   1.76      .07
                             TOPOFSTACK DSPOBJD   DSPOBJD    0B90 *WSP S            61   1.65      .06
                             TOPOFSTACK TESTIO               0201 *WSP S            54   1.46      .06
                             TOPOFSTACK OPEN5                0201 *WSP S            49   1.33      .05
                             TOPOFSTACK QRNXDUMP             0203 *WSP S            49   1.33      .05
                             TOPOFSTACK QRNXIE               0203 *WSP S            49   1.33      .05
                             TOPOFSTACK D7A7822472O0         0000 *WSP S            40   1.08      .04
                             TOPOFSTACK D2FB76C772O0         0000 *WSP S            38   1.03      .04
                             TOPOFSTACK D56C3B528F00         0000 *WSP S            38   1.03      .04
                             TOPOFSTACK ILEAGN               0201 *WSP S            37   1.00      .04
                             TOPOFSTACK E7CB3ED36004         0000 *WSP S            18    .49      .02
                             TOPOFSTACK QATOCTCPIPCONFIG     0C90 *WSP S             7    .19      .01
                             TOPOFSTACK D1EDE9BC470O         0000 *WSP S             6    .16      .01
                             TOPOFSTACK QTMPLPRC             0201 *WSP S             6    .16      .01
                             TOPOFSTACK SQCCSID1             0ED2 *WSP S             6    .16      .01
                             TOPOFSTACK EEE05252CB0O         0000 *WSP S             4    .11      .00
                             TOPOFSTACK QCAPLIST             19FC *WSP S             4    .11      .00
                             TOPOFSTACK FC64411FC004         0000 *WSP S             3    .08      .00
                             TOPOFSTACK QATOCTCPIPCONFIG     0B90 *WSP S             3    .08      .00
                             TOPOFSTACK QCAPLIST             19EF *WSP S             3    .08      .00
                             TOPOFSTACK QTCP                 0401 *WSP S             3    .08      .00
                             TOPOFSTACK QTQICONV             0203 *WSP S             3    .08      .00
                             TOPOFSTACK ECB9E6FE0E00         0000 *WSP S             2    .05      .00
                             TOPOFSTACK E43BF962E500         0000 *WSP S             2    .05      .00
                             TOPOFSTACK FE38ECDB8004         0000 *WSP S             2    .05      .00
                             TOPOFSTACK F836A3DBEA00         0000 *WSP S             2    .05      .00
                             TOPOFSTACK QPOLLIB1             0203 *WSP S             2    .05      .00
                             TOPOFSTACK QSO_DNS_INDEX        0EEF *WSP S             2    .05      .00
                             TOPOFSTACK F5428E447004         0000 *WSP S             1    .03      .00
                             TOPOFSTACK QCASQ                0AEF *WSP S             1    .03      .00
                             TOPOFSTACK QCAWAREA             19FC *WSP S             1    .03      .00
                             TOPOFSTACK QPOSSRV3             0203 *WSP S             1    .03      .00
                             TOPOFSTACK QSOSRV2              0203 *WSP S             1    .03      .00
                             TOPOFSTACK QTCPMSGF             0E03 *WSP S             1    .03      .00
                             TOPOFSTACK ILEAGNEW  A960126A   1AEF *WSP S           650  17.71      .69
```

Figure 99 (Part 8 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   16
Process    Job        Job    Program    Object                    PDIO          PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper          Count    Job      ALL
                                                                                         IO       IO
                            TOPOFSTACK *DESTROYED           0000 *WSP S           485  13.22     .51
                            TOPOFSTACK FCFA2024DA00         0000 *WSP S           484  13.19     .51
                            TOPOFSTACK SEIZE LOCK RANGE     0000 *WSP S           146   3.98     .15
                            TOPOFSTACK QCAWAREA             19EF *WSP S           141   3.84     .15
                            TOPOFSTACK C3E62C036004         0000 *WSP S           123   3.35     .13
                            TOPOFSTACK OPENBAD   A960126A   1AEF *WSP S           113   3.08     .12
                            TOPOFSTACK JUNK      QSPLJOB    1AEF *WSP S           108   2.94     .11
                            TOPOFSTACK C2E7BB3D7004         0000 *WSP S            87   2.37     .09
                            TOPOFSTACK QJOBMSGQ             18A0 *WSP S            83   2.26     .09
                            TOPOFSTACK F86D14F54004         0000 *WSP S            81   2.21     .09
                            TOPOFSTACK PF05      PF05       0B90 *WSP S            79   2.15     .08
                            TOPOFSTACK D3334BC40004         0000 *WSP S            77   2.10     .08
                            TOPOFSTACK FD3057655004         0000 *WSP S            73   1.99     .08
                            TOPOFSTACK DSPOBJD   DSPOBJD    0B90 *WSP S            72   1.96     .08
                            TOPOFSTACK F5075E554004         0000 *WSP S            70   1.91     .07
                            TOPOFSTACK PF04      PF04       0B90 *WSP S            70   1.91     .07
                            TOPOFSTACK F3CA6CD12004         0000 *WSP S            65   1.77     .07
                            TOPOFSTACK PF01      PF01       0B90 *WSP S            64   1.74     .07
                            TOPOFSTACK PF02      PF02       0B90 *WSP S            63   1.72     .07
                            TOPOFSTACK PF03      PF03       0B90 *WSP S            63   1.72     .07
                            TOPOFSTACK QRNXDUMP             0203 *WSP S            56   1.53     .06
                            TOPOFSTACK TESTIO               0201 *WSP S            54   1.47     .06
                            TOPOFSTACK ILEAGN               0201 *WSP S            50   1.36     .05
                            TOPOFSTACK OPEN5                0201 *WSP S            46   1.25     .05
                            TOPOFSTACK QRNXIE               0203 *WSP S            45   1.23     .05
                            TOPOFSTACK D56C3B528F00         0000 *WSP S            39   1.06     .04
                            TOPOFSTACK D2FB76C77200         0000 *WSP S            38   1.04     .04
                            TOPOFSTACK D7A7822472O0         0000 *WSP S            35    .95     .04
                            TOPOFSTACK E7CB3ED36004         0000 *WSP S            22    .60     .02
                            TOPOFSTACK E43BF962E500         0000 *WSP S             8    .22     .01
                            TOPOFSTACK FC64411FC004         0000 *WSP S             8    .22     .01
                            TOPOFSTACK F5428E447004         0000 *WSP S             6    .16     .01
                            TOPOFSTACK QATOCTCPIPCONFIG     0C90 *WSP S             6    .16     .01
                            TOPOFSTACK QCAPLIST             19EF *WSP S             6    .16     .01
                            TOPOFSTACK SQCCSID1             0ED2 *WSP S             6    .16     .01
                            TOPOFSTACK D1EDE9BC4700         0000 *WSP S             5    .14     .01

08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   17
Process    Job        Job    Program    Object                    PDIO          PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper          Count    Job      ALL
                                                                                         IO       IO
                            TOPOFSTACK EEE05252CB00         0000 *WSP S             5    .14     .01
                            TOPOFSTACK QATOCTCPIPCONFIG     0B90 *WSP S             5    .14     .01
                            TOPOFSTACK FE38ECDB8004         0000 *WSP S             4    .11     .00
                            TOPOFSTACK F836A3DBEA00         0000 *WSP S             4    .11     .00
                            TOPOFSTACK ECB9E6FE0E00         0000 *WSP S             3    .08     .00
                            TOPOFSTACK QCAWAREA             19FC *WSP S             3    .08     .00
                            TOPOFSTACK QPOSSRV3             0203 *WSP S             3    .08     .00
                            TOPOFSTACK QSOSRV2              0203 *WSP S             3    .08     .00
                            TOPOFSTACK FCAE14909A00         0000 *WSP S             2    .05     .00
                            TOPOFSTACK QCAPLIST             19FC *WSP S             2    .05     .00
                            TOPOFSTACK QCASQ                0AEF *WSP S             2    .05     .00
                            TOPOFSTACK QSO_DNS_INDEX        0EEF *WSP S             2    .05     .00
                            TOPOFSTACK QSOSRV1              0203 *WSP S             1    .03     .00
                            TOPOFSTACK QTCPMSGF             0E03 *WSP S             1    .03     .00
                            TOPOFSTACK QTMPLPRC             0201 *WSP S             1    .03     .00
                            TOPOFSTACK QTQICONV             0203 *WSP S             1    .03     .00
                            TOPOFSTACK QYPPRT               0203 *WSP S             1    .03     .00
                            TOPOFSTACK ILEAGNEW  A960126A   1AEF *WSP S           613  16.73     .65
                            TOPOFSTACK *DESTROYED           0000 *WSP S           483  13.19     .51
                            TOPOFSTACK FCFA2024DA00         0000 *WSP S           469  12.80     .50
                            TOPOFSTACK SEIZE LOCK RANGE     0000 *WSP S           158   4.31     .17
                            TOPOFSTACK QCAWAREA             19EF *WSP S           146   3.99     .15
                            TOPOFSTACK OPENBAD   A960126A   1AEF *WSP S           132   3.60     .14
                            TOPOFSTACK JUNK      QSPLJOB    1AEF *WSP S           114   3.11     .12
                            TOPOFSTACK C3E62C036004         0000 *WSP S           109   2.98     .12
                            TOPOFSTACK F5075E554004         0000 *WSP S           102   2.78     .11
                            TOPOFSTACK F86D14F54004         0000 *WSP S            86   2.35     .09
                            TOPOFSTACK QJOBMSGQ             18A0 *WSP S            84   2.29     .09
                            TOPOFSTACK C2E7BB3D7004         0000 *WSP S            81   2.21     .09
                            TOPOFSTACK PF04      PF04       0B90 *WSP S            76   2.07     .08
                            TOPOFSTACK D3334BC40004         0000 *WSP S            72   1.97     .08
                            TOPOFSTACK FD3057655004         0000 *WSP S            72   1.97     .08
                            TOPOFSTACK DSPOBJD   DSPOBJD    0B90 *WSP S            71   1.94     .08
                            TOPOFSTACK PF05      PF05       0B90 *WSP S            69   1.88     .07
                            TOPOFSTACK F3CA6CD12004         0000 *WSP S            65   1.77     .07
                            TOPOFSTACK QRNXDUMP             0203 *WSP S            64   1.75     .07
```

Figure 99 (Part 9 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   18
Process    Job        Job    Program    Object                    PDIO           PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper           Count    Job      ALL
                                                                                          IO       IO
                             TOPOFSTACK PFO1      PFO1       0B90 *WSP S            63   1.72     .07
                             TOPOFSTACK PFO2      PFO2       0B90 *WSP S            61   1.67     .06
                             TOPOFSTACK D2FB76C7720O         0000 *WSP S            60   1.64     .06
                             TOPOFSTACK PFO3      PFO3       0B90 *WSP S            59   1.61     .06
                             TOPOFSTACK TESTIO               0201 *WSP S            49   1.34     .05
                             TOPOFSTACK QRNXIE               0203 *WSP S            47   1.28     .05
                             TOPOFSTACK OPEN5                0201 *WSP S            46   1.26     .05
                             TOPOFSTACK D7A7822472OO         0000 *WSP S            40   1.09     .04
                             TOPOFSTACK D56C3B528FOO         0000 *WSP S            39   1.06     .04
                             TOPOFSTACK ILEAGN               0201 *WSP S            35    .96     .04
                             TOPOFSTACK E7CB3ED36004         0000 *WSP S            13    .35     .01
                             TOPOFSTACK FC64411FC004         0000 *WSP S             9    .25     .01
                             TOPOFSTACK E43BF962E50O         0000 *WSP S             7    .19     .01
                             TOPOFSTACK F5428E447004         0000 *WSP S             5    .14     .01
                             TOPOFSTACK F836A3DBEAOO         0000 *WSP S             5    .14     .01
                             TOPOFSTACK QATOCTCPIPCONFIG     0C90 *WSP S             5    .14     .01
                             TOPOFSTACK QCAPLIST             19EF *WSP S             5    .14     .01
                             TOPOFSTACK QCAPLIST             19FC *WSP S             5    .14     .01
                             TOPOFSTACK QATOCTCPIPCONFIG     0B90 *WSP S             4    .11     .00
                             TOPOFSTACK QSOSRV1              0203 *WSP S             4    .11     .00
                             TOPOFSTACK D1EDE9BC470O         0000 *WSP S             3    .08     .00
                             TOPOFSTACK ECB9E6FE0E0O         0000 *WSP S             3    .08     .00
                             TOPOFSTACK EEE05252CBOO         0000 *WSP S             3    .08     .00
                             TOPOFSTACK FCAE1490 9AOO        0000 *WSP S             3    .08     .00
                             TOPOFSTACK QTMPLPRC             0201 *WSP S             3    .08     .00
                             TOPOFSTACK SQCCSID1             0ED2 *WSP S             3    .08     .00
                             TOPOFSTACK FE38ECDB8004         0000 *WSP S             2    .05     .00
                             TOPOFSTACK QCASQ                0AEF *WSP S             2    .05     .00
                             TOPOFSTACK QCAWAREA             19FC *WSP S             2    .05     .00
                             TOPOFSTACK QPOLLIB1             0203 *WSP S             2    .05     .00
                             TOPOFSTACK QPOSSRV3             0203 *WSP S             2    .05     .00
                             TOPOFSTACK QSO_DNS_INDEX        0EEF *WSP S             2    .05     .00
                             TOPOFSTACK QSOSRV2              0203 *WSP S             2    .05     .00
                             TOPOFSTACK QTQICONV             0203 *WSP S             2    .05     .00
                             TOPOFSTACK QTCPMSGF             0E03 *WSP S             1    .03     .00
                             TOPOFSTACK QYPPRT               0203 *WSP S             1    .03     .00

08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   19
Process    Job        Job    Program    Object                    PDIO           PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper           Count    Job      ALL
                                                                                          IO       IO
                             TOPOFSTACK ILEAGNEW  A960126A   1AEF *WSP S           626  17.15     .66
                             TOPOFSTACK FCFA2024DAOO         0000 *WSP S           458  12.54     .48
                             TOPOFSTACK *DESTROYED           0000 *WSP S           441  12.08     .47
                             TOPOFSTACK SEIZE LOCK RANGE     0000 *WSP S           162   4.44     .17
                             TOPOFSTACK QCAWAREA             19EF *WSP S           152   4.16     .16
                             TOPOFSTACK OPENBAD   A960126A   1AEF *WSP S           139   3.81     .15
                             TOPOFSTACK JUNK      QSPLJOB    1AEF *WSP S           103   2.82     .11
                             TOPOFSTACK F86D14F540O4         0000 *WSP S            99   2.71     .10
                             TOPOFSTACK C3E62C036004         0000 *WSP S            98   2.68     .10
                             TOPOFSTACK QJOBMSGQ             18A0 *WSP S            85   2.33     .09
                             TOPOFSTACK C2E7BB3D7004         0000 *WSP S            82   2.25     .09
                             TOPOFSTACK F5075E554004         0000 *WSP S            82   2.25     .09
                             TOPOFSTACK PFO4      PFO4       0B90 *WSP S            79   2.16     .08
                             TOPOFSTACK D3334BC40004         0000 *WSP S            77   2.11     .08
                             TOPOFSTACK FD3057655004         0000 *WSP S            72   1.97     .08
                             TOPOFSTACK PFO1      PFO1       0B90 *WSP S            71   1.94     .08
                             TOPOFSTACK D2FB76C7720O         0000 *WSP S            69   1.89     .07
                             TOPOFSTACK PFO5      PFO5       0B90 *WSP S            69   1.89     .07
                             TOPOFSTACK PFO2      PFO2       0B90 *WSP S            68   1.86     .07
                             TOPOFSTACK QRNXDUMP             0203 *WSP S            68   1.86     .07
                             TOPOFSTACK F3CA6CD1200 4        0000 *WSP S            64   1.75     .07
                             TOPOFSTACK DSPOBJD   DSPOBJD   0B90 *WSP S            62   1.70     .07
                             TOPOFSTACK PFO3      PFO3       0B90 *WSP S            61   1.67     .06
                             TOPOFSTACK D7A7822472OO         0000 *WSP S            52   1.42     .05
                             TOPOFSTACK QRNXIE               0203 *WSP S            50   1.37     .05
                             TOPOFSTACK TESTIO               0201 *WSP S            47   1.29     .05
                             TOPOFSTACK OPEN5                0201 *WSP S            43   1.18     .05
                             TOPOFSTACK D56C3B528FOO         0000 *WSP S            38   1.04     .04
                             TOPOFSTACK ILEAGN               0201 *WSP S            34    .93     .04
                             TOPOFSTACK E43BF962E50O         0000 *WSP S            13    .36     .01
                             TOPOFSTACK E7CB3ED36004         0000 *WSP S             9    .25     .01
                             TOPOFSTACK QCAPLIST             19EF *WSP S             7    .19     .01
                             TOPOFSTACK FE38ECDB8004         0000 *WSP S             6    .16     .01
                             TOPOFSTACK FCAE1490 9AOO        0000 *WSP S             5    .14     .01
                             TOPOFSTACK F836A3DBEAOO         0000 *WSP S             5    .14     .01
                             TOPOFSTACK SQCCSID1             0ED2 *WSP S             5    .14     .01
```

Figure 99 (Part 10 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   20
Process    Job        Job    Program    Object                    PDIO          PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper          Count    Job      ALL
                                                                                         IO       IO
                              TOPOFSTACK ECB9E6FE0E00         0000 *WSP S            4    .11      .00
                              TOPOFSTACK F5428E447004         0000 *WSP S            4    .11      .00
                              TOPOFSTACK QCAPLIST             19FC *WSP S            4    .11      .00
                              TOPOFSTACK QCAWAREA             19FC *WSP S            4    .11      .00
                              TOPOFSTACK QSOSRV2              0203 *WSP S            4    .11      .00
                              TOPOFSTACK QATOCTCPIPCONFIG     0C90 *WSP S            3    .08      .00
                              TOPOFSTACK QPOLLIB1             0203 *WSP S            3    .08      .00
                              TOPOFSTACK QSO_DNS_INDEX        0EEF *WSP S            3    .08      .00
                              TOPOFSTACK QSOSRV1              0203 *WSP S            3    .08      .00
                              TOPOFSTACK QYPPRT               0203 *WSP S            3    .08      .00
                              TOPOFSTACK D1EDE9BC4700         0000 *WSP S            2    .05      .00
                              TOPOFSTACK EEE05252CB00         0000 *WSP S            2    .05      .00
                              TOPOFSTACK FC64411FC004         0000 *WSP S            2    .05      .00
                              TOPOFSTACK QATOCTCPIPCONFIG     0B90 *WSP S            2    .05      .00
                              TOPOFSTACK QPOSSRV3             0203 *WSP S            2    .05      .00
                              TOPOFSTACK QTQICONV             0203 *WSP S            2    .05      .00
                              TOPOFSTACK QTCP                 0401 *WSP S            1    .03      .00
                              TOPOFSTACK QTCPMSGF             0E03 *WSP S            1    .03      .00
                              TOPOFSTACK QTMPLPRC             0201 *WSP S            1    .03      .00
                                                                     TOTAL       26,235
P23ARTVKE  A960126A   053319 QWTCCRLJ   QWCBT01               19D0 *RX  A        1,062  80.27    1.12
                             QWTCCRLJ   QWCBT01               19D0 *RSF S            7    .53      .01
                             QWTCCRLJ   QSPSCB                19C2 *RSF S            3    .23      .00
                             QWTCCRLJ   QWCBT01               19D0 *RS  A            3    .23      .00
                             QWTCCRLJ   QWCBT01               19D0 *RS  S            3    .23      .00
                             QWTCCRLJ   D1EDE9BC4700          0000 *RSF S            2    .15      .00
                             QWTCCRLJ   QWTCCRLJ              0201 *RSF S            2    .15      .00
                             QWTCCRLJ   QSPCHJOB              0201 *RS  S            1    .08      .00
                             QWTCCRLJ   SM PERM DIR SEGMENT   0000 *RSF S            1    .08      .00
                             TOPOFSTACK QWCBT01               19D0 *RSF S           89   6.73      .09
                             TOPOFSTACK P23XWY32  A960123A    1AEF *RSF S            3    .23      .00
                             TOPOFSTACK SEIZE LOCK RANGE      0000 *RSF S            2    .15      .00
                             TOPOFSTACK ASJ1LU    QSNADS      1AEF *RSF S            1    .08      .00
                             TOPOFSTACK CENTRAL   QGATE       1AEF *RSF S            1    .08      .00


08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   21
Process    Job        Job    Program    Object                    PDIO          PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper          Count    Job      ALL
                                                                                         IO       IO
P23ARTVKE  A960126A   053319 TOPOFSTACK COOKPCF   COOK          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK L/L RANGE 1             0000 *RSF S            1    .08      .00
                             TOPOFSTACK PAG                     01EF *RSF S            1    .08      .00
                             TOPOFSTACK PRTASM01  QSPLJOB       1AEF *RSF S            1    .08      .00
                             TOPOFSTACK P23ARTVK  A960126A      1AEF *RSF S            1    .08      .00
                             TOPOFSTACK P23LK296  MRK           1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QAPPCTCP  QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QBATCH    QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QDBSRV01  QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QDBSRV02  QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QDBSRV03  QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QDBSRV04  QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QDBSRV05  QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QDCPOBJ1  QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QDCPOBJ2  QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QDIA      QSNADS        1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QDIAHSTPRTQSNADS        1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QDIAINDUSRQSNADS        1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QDIALOCAL QSNADS        1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QJOBSCD   QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QNMAPINGD QUSER         1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QNMAREXECDQUSER         1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QNPSERVR  QUSER         1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QPFRADJ   QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QPWFSERVSDQUSER         1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QPWFSERVSOQUSER         1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QROUTER   QSNADS        1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QSERVER   QPGMR         1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QSNADS                  1909 *RSF S            1    .08      .00
                             TOPOFSTACK QSNADS    QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QSNMPSA   QTCP          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QSPL      QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QSYSARB2  QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QSYSARB4  QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QSYSARB5  QSYS          1AEF *RSF S            1    .08      .00
                             TOPOFSTACK QSYSSCD   QPGMR         1AEF *RSF S            1    .08      .00
```

Figure 99 (Part 11 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   22
Process    Job        Job    Program    Object                    PDIO           PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper           Count    Job      ALL
                                                                                          IO       IO
P23ARTVKE  A960126A   053319 TOPOFSTACK QTCPIP    QTCP       1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QTFTP00148QTCP       1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QTFTP00176QTCP       1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QTFTP00182QTCP       1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QTFTP12182QTCP       1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QTLPD12902QTCP       1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QTLPD12931QTCP       1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QTMSNMP   QTCP       1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QTMSNMPRCVQTCP       1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QTSMTPBRCLQTCP       1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QTSMTPBRSRQTCP       1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QTSMTPCLNTQTCP       1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QTSMTPSRVRQTCP       1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QZDAINITP2QUSER      1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QZDASOINITQUSER      1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QZDASRVSD QUSER      1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QZHQSRVD  QUSER      1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QZHQSSRV  QUSER      1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QZRCSRVR  QUSER      1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QZRCSRVS  QUSER      1AEF *RSF S            1    .08      .00
                              TOPOFSTACK QZRCSRVSD QUSER      1AEF *RSF S            1    .08      .00
                              TOPOFSTACK Q4OOFILSVRQSYS       1AEF *RSF S            1    .08      .00
                              TOPOFSTACK RCHASA05  QGATE      1AEF *RSF S            1    .08      .00
                              TOPOFSTACK RCHASM01  QGATE      1AEF *RSF S            1    .08      .00
                              TOPOFSTACK RCHASM01  QSNADS     1AEF *RSF S            1    .08      .00
                              TOPOFSTACK RCHASM02  QGATE      1AEF *RSF S            1    .08      .00
                              TOPOFSTACK RCHASM02  QSNADS     1AEF *RSF S            1    .08      .00
                              TOPOFSTACK RCHASM03  QSNADS     1AEF *RSF S            1    .08      .00
                              TOPOFSTACK RCHASM06  QSNADS     1AEF *RSF S            1    .08      .00
                              TOPOFSTACK RCHASM09  QSNADS     1AEF *RSF S            1    .08      .00
                              TOPOFSTACK RCHASM12  QSNADS     1AEF *RSF S            1    .08      .00
                              TOPOFSTACK RCHASM13  QSNADS     1AEF *RSF S            1    .08      .00
                              TOPOFSTACK RCHASO40  QSNADS     1AEF *RSF S            1    .08      .00
                              TOPOFSTACK SM PERM DIR SEGMENT  0000 *RSF S            1    .08      .00
                              TOPOFSTACK TARGET1   QGATE      1AEF *RSF S            1    .08      .00
                              TOPOFSTACK TARGET2   QGATE      1AEF *RSF S            1    .08      .00

08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   23
Process    Job        Job    Program    Object                    PDIO           PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper           Count    Job      ALL
                                                                                          IO       IO
P23ARTVKE  A960126A   053319 TOPOFSTACK TCPIPLOC  QGATE      1AEF *RSF S            1    .08      .00
                              QMHSNDPM   QJOBMSGQ           18A0 *RSF S            9    .68      .01
                              QMHSNDPM   QCPFMSG             0EO3 *RSF S            2    .15      .00
                              QMHSNDPM   QMHSNDPM            02O1 *RSF S            1    .08      .00
                              QMHSNDPM   QUIALIST            02O1 *RSF S            1    .08      .00
                              QMHSNDPM   SM PERM DIR SEGMENT  0000 *RSF S            1    .08      .00
                              QMHSNSTQ   QSYSOPR             19O2 *WS  A            6    .45      .01
                              QMHSNSTQ   QHST                19O2 *WS  S            3    .23      .00
                              QMHSNSTQ   QWCBTO1             19DO *RSF S            3    .23      .00
                              QMHSNSTQ   QSYSOPR             19O2 *RSF S            1    .08      .00
                              QMHSNSTQ   QWTCCRLJ            02O1 *RSF S            1    .08      .00
                              QUIMGFLW   QGWCAJOB            1915 *RSF S            5    .38      .01
                              QUIMGFLW   QUIALIST            02O1 *RS  S            2    .15      .00
                              QUIMGFLW   UIM_TEMPORARY_WORKSP 19EF *RS  S            2    .15      .00
                              QUIMGFLW   QGWCSSTS            1915 *RSF S            1    .08      .00
                              QUIMGFLW   SM PERM DIR SEGMENT  0000 *RSF S            1    .08      .00
                              QUICMD     QWCSHUIC            02O1 *RS  S            2    .15      .00
                              QUICMD     QWTCCRLJ            02O1 *RS  S            2    .15      .00
                              QUICMD     QUICMD              02O1 *RSF S            1    .08      .00
                              QUICMD     SM PERM DIR SEGMENT  0000 *RSF S            1    .08      .00
                              QWCCDSTC   *DESTROYED          0000 *RSF S            2    .15      .00
                              QWCCDSTC   QEZWRAST            02O1 *RS  S            2    .15      .00
                              QWCCDSTC   SM PERM DIR SEGMENT  0000 *RSF S            1    .08      .00
                              QSPCHJOB   QSPSCB              19C2 *WS  S            3    .23      .00
                              QSPCHJOB   SEIZE LOCK RANGE    0000 *RSF S            1    .08      .00
                              QUIICHK    QGWCAJOB            1915 *RSF S            2    .15      .00
                              QUIICHK    QUIICHK             02O1 *RSF S            1    .08      .00
                              QCARULE    RLSJOB              19O5 *RSF S            1    .08      .00
                              QCARULE    SM PERM DIR SEGMENT  0000 *RSF S            1    .08      .00
                              QEZWRAST   QEZWRAST            02O1 *RSF S            1    .08      .00
                              QEZWRAST   SM PERM DIR SEGMENT  0000 *RSF S            1    .08      .00
                              QUIEXFMT   QGWCAJOB            1915 *RSF S            2    .15      .00
                              QUIINMGR   UIM_TEMPORARY_WORKSP 19EF *RSF S            2    .15      .00
                              QCATRS     RLSJOB              19O5 *WS  A            1    .08      .00
                              QUIALIST   QUIALIST            02O1 *RSF S            1    .08      .00
                              QUILIST    UIM_TEMPORARY_WORKSP 19EF *RSF S            1    .08      .00
```

Figure 99 (Part 12 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   24
Process    Job        Job    Program    Object                    PDIO          PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper          Count    Job      ALL
                                                                                         IO       IO
P23ARTVKE  A960126A   053319 QUIVPMGR   QGWCAJOB             1915 *RSF S            1    .08      .00
                             QWCSHUIC   QWCSHUIC             0201 *RSF S            1    .08      .00
                                                                  TOTAL         1,323
PEXTRACE   A960126A   053555 QSPRCMBR   Q04079N002Q097276464 0B90 *WS  S           25   8.31      .03
                             QSPRCMBR   QSPSCB               19C2 *WSP S            7   2.33      .01
                             QSPRCMBR   DATA BASE IN-USE TBL 0000 *WS  S            6   1.99      .01
                             QSPRCMBR   Q04079N002Q097276464 0B90 *WSP S            5   1.66      .01
                             QSPRCMBR   L/L RANGE 1          0000 *RSF S            2    .66      .00
                             QSPRCMBR   QSPFACB              0EC6 *RSF S            1    .33      .00
                             QSPRCMBR   QSPRCMBR             0201 *RSF S            1    .33      .00
                             QSPRCMBR   Q04079N002Q097276464 0B90 *RSF S            1    .33      .00
                             QSPOPEN    QSPSCB               19C2 *WSP S           10   3.32      .01
                             QSPOPEN    A960126A             0E02 *WS  S            5   1.66      .01
                             QSPOPEN    SM PERM DIR SEGMENT  0000 *RSF S            4   1.33      .00
                             QSPOPEN    QSPFRMQ              0EC7 *RSF S            3   1.00      .00
                             QSPOPEN    QSPQJBQ              0EC7 *RSF S            3   1.00      .00
                             QSPOPEN    QSPUDTQ              0EC7 *RSF S            3   1.00      .00
                             QSPOPEN    SEIZE LOCK RANGE     0000 *RSF S            3   1.00      .00
                             QSPOPEN    A960126A             0E02 *RSF S            2    .66      .00
                             QSPOPEN    QSPDEVQ              0EC7 *RSF S            2    .66      .00
                             QSPOPEN    QSYCPYIP             0201 *RS  S            2    .66      .00
                             QSPOPEN    *SECTOR I/O          0000 *WS  S            1    .33      .00
                             QSPOPEN    EB01856CB900         0000 *RSF S            1    .33      .00
                             QSPOPEN    QSPL                 0801 *RSF S            1    .33      .00
                             QSPOPEN    QSPSCB               19C2 *WS  S            1    .33      .00
                             QSPOPEN    QSPSIDQ              0EC7 *RSF S            1    .33      .00
                             QSPCLOSE   Q04079N002Q097276464 0B90 *WSP A           10   3.32      .01
                             QSPCLOSE   DATA BASE IN-USE TBL 0000 *WS  S            6   1.99      .01
                             QSPCLOSE   QSPSCB               19C2 *WSP S            6   1.99      .01
                             QSPCLOSE   A960126A             0E02 *WS  S            5   1.66      .01
                             QSPCLOSE   Q04079N002Q097276464 0B90 *WS  S            5   1.66      .01
                             QSPCLOSE   QSPCLOSE             0201 *RSF S            1    .33      .00
                             QSPCLOSE   Q04079N002Q097276464 0B90 *RSF S            1    .33      .00
                             QDBCRTME   PFREXP2              0401 *WS  S            6   1.99      .01

08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   25
Process    Job        Job    Program    Object                    PDIO          PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper          Count    Job      ALL
                                                                                         IO       IO
PEXTRACE   A960126A   053555 QDBCRTME   PF132     PEXTRACSTS 0B90 *WS  A            4   1.33      .00
                             QDBCRTME   SM PERM DIR SEGMENT  0000 *RSF S            3   1.00      .00
                             QDBCRTME                        1D34 *RSF S            2    .66      .00
                             QDBCRTME   *DESTROYED           0000 *WS  A            2    .66      .00
                             QDBCRTME   A960126A             0801 *RSF S            2    .66      .00
                             QDBCRTME   A960126A             0801 *WS  S            2    .66      .00
                             QDBCRTME   PF132     PEXTRACSTS 0D50 *WS  A            2    .66      .00
                             QDBCRTME   QDBSHR               0801 *WS  S            2    .66      .00
                             QDBCRTME   *DESTROYED           0000 *WS  S            1    .33      .00
                             QDBCRTME   *SECTOR I/O          0000 *WS  S            1    .33      .00
                             QDBCRTME   D2AF210B2004         0000 *RSF S            1    .33      .00
                             QDBCRTME   FREE SPACE MAP RANGE 0000 *RSF S            1    .33      .00
                             QDBCRTME   PF132                1901 *WS  A            1    .33      .00
                             QDBCRTME   PF132     PEXTRACSTS 0D50 *WS  S            1    .33      .00
                             QDBCRTME   QDBSHR               0801 *RSF S            1    .33      .00
                             QWCCDSTC   *DESTROYED           0000 *RSF S           10   3.32      .01
                             QWCCDSTC   FD4657807900         0000 *RSF S            5   1.66      .01
                             QWCCDSTC   QUICLOSE             0201 *RS  S            2    .66      .00
                             TOPOFSTACK QC2UTIL1             0203 *RSF S            3   1.00      .00
                             TOPOFSTACK SM PERM DIR SEGMENT  0000 *RSF S            3   1.00      .00
                             TOPOFSTACK QSPCNSPF             0201 *RSF S            2    .66      .00
                             TOPOFSTACK QSPCPYF              0201 *RS  S            2    .66      .00
                             TOPOFSTACK QSPHNMLT             0201 *RS  S            2    .66      .00
                             TOPOFSTACK QYPESVSE             0203 *RSF S            2    .66      .00
                             TOPOFSTACK QSPHNMLT             0201 *RSF S            1    .33      .00
                             TOPOFSTACK QYPEENDP             0201 *RSF S            1    .33      .00
                             QDBFEOD    PF132     PEXTRACSTS 0B90 *WS  S            6   1.99      .01
                             QDBFEOD    DATA BASE IN-USE TBL 0000 *WS  S            3   1.00      .00
                             QDBFEOD    PF132     PEXTRACSTS 0B90 *WSP S            3   1.00      .00
                             QDBFEOD    *SECTOR I/O          0000 *WS  S            1    .33      .00
                             QDBFEOD    PF132     PEXTRACSTS 0B90 *WSP A            1    .33      .00
                             QUIMGFLW   UIM_TEMPORARY_WORKSP 19EF *RS  S            9   2.99      .01
                             QUIMGFLW   QGWCSSTS             1915 *RSF S            2    .66      .00
                             QUIMGFLW   QUIMGFLW             0201 *RSF S            2    .66      .00
                             QUIMGFLW   UIM_TEMPORARY_WORKSP 19EF *RSF S            1    .33      .00
                             QSPCNSPF   A960126A             0E02 *WS  S            5   1.66      .01
```

Figure 99 (Part 13 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   26
Process    Job        Job    Program    Object                    PDIO           PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper           Count    Job      ALL
                                                                                          IO       IO
PEXTRACE   A960126A   053555 QSPCNSPF   QSPCNSPF             0201 *RSF S             2    .66      .00
                             QSPCNSPF   QSPRCMBR             0201 *RSF S             2    .66      .00
                             QSPCNSPF   SM PERM DIR SEGMENT  0000 *RSF S             1    .33      .00
                             QUIPRINT   UIM_TEMPORARY_WORKSP 19EF *RS  S             7   2.33      .01
                             QUIPRINT   UIM_TEMPORARY_WORKSP 19EF *RSF S             2    .66      .00
                             QUIPRINT   QGWCSSTS             1915 *RSF S             1    .33      .00
                             QSPCPYF    QSPCPYF              0201 *RSF S             4   1.33      .00
                             QSPCPYF    QSPDSPFX             0201 *RS  S             2    .66      .00
                             QSPCPYF    PFREXP2              0401 *RSF S             1    .33      .00
                             QSPCPYF    SM PERM DIR SEGMENT  0000 *RSF S             1    .33      .00
                             QCARULE    QSYS                 0401 *RSF S             4   1.33      .00
                             QCARULE    CPYSPLF              1905 *RSF S             1    .33      .00
                             QCARULE    ENDPEX               1905 *RSF S             1    .33      .00
                             QDMCLOSE   PF132     PEXTRACSTS 0B90 *WS  S             3   1.00      .00
                             QDMCLOSE   PF132     PEXTRACSTS 0B90 *WS  A             1    .33      .00
                             QDMCLOSE   QSPCLOSE             0201 *RS  S             1    .33      .00
                             QDMCLOSE   SM PERM DIR SEGMENT  0000 *RSF S             1    .33      .00
                             QWPALLOC   QWPALLOC             0201 *RSF S             6   1.99      .01
                             QCANPARS   SQCCSID1             0ED2 *RSF S             4   1.33      .00
                             QCANPARS   SEIZE LOCK RANGE     0000 *RSF S             1    .33      .00
                             QSYGRTSA   A960126A             0801 *RSF S             3   1.00      .00
                             QSYGRTSA   PF132     PEXTRACSTS 0B90 *WSP S             1    .33      .00
                             QSYGRTSA   PF132     PEXTRACSTS 0D50 *WSP S             1    .33      .00
                             QDMCOPEN   EE32788FC300          0000 *RSF S             1    .33      .00
                             QDMCOPEN   L/L RANGE 1           0000 *RSF S             1    .33      .00
                             QDMCOPEN   QSYS                  0401 *RSF S             1    .33      .00
                             QDMCOPEN   QUIOPEN               0201 *RSF S             1    .33      .00
                             QCATRS     QYPEENDP              0201 *RSF S             2    .66      .00
                             QCATRS     SM PERM DIR SEGMENT   0000 *RSF S             1    .33      .00
                             QUICLOSE   QUICLOSE              0201 *RSF S             2    .66      .00
                             QUICLOSE   SM PERM DIR SEGMENT   0000 *RSF S             1    .33      .00
                             QCADRV     QCAIFLD               0201 *RS  S             2    .66      .00
                             QLIMROIR   QSYS                  0E90 *RSF S             1    .33      .00
                             QLIMROIR   QSYS                  1952 *RSF S             1    .33      .00
                             QMHSNDPM   QCPFMSG               0E03 *RSF S             2    .66      .00
                             QSPDSPFX   QSPDSPFX              0201 *RSF S             1    .33      .00

08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   27
Process    Job        Job    Program    Object                    PDIO           PDIO     PCT      PCT
job name   user       number            Name/Type                 Oper           Count    Job      ALL
                                                                                          IO       IO
PEXTRACE   A960126A   053555 QSPDSPFX   SM PERM DIR SEGMENT  0000 *RSF S             1    .33      .00
                             QUICBINT   QUICBINT             0201 *RSF S             1    .33      .00
                             QUICBINT   SM PERM DIR SEGMENT  0000 *RSF S             1    .33      .00
                             QUIOPEN    QUICBINT             0201 *RSF S             2    .66      .00
                             QCLCLCPR   QSYS                 0401 *RSF S             1    .33      .00
                             QMHRTMSS   QCPFMSG              0E03 *RSF S             1    .33      .00
                             QSPHNMLT   QSPHNMLT             0201 *RSF S             1    .33      .00
                             QSYACCIP   QSYS                 0401 *RSF S             1    .33      .00
                             QUILIST    QUILIST              0201 *RSF S             1    .33      .00
                             QWPPUT     SEIZE LOCK RANGE     0000 *RSF S             1    .33      .00
                                                                      TOTAL          301
PEXSBSD    QSYS       053539 QWTMMRLJ   QWTMMRLJ             0201 *RSF S             6  37.50      .01
                             QWTMMRLJ   D1EDE9BC4700          0000 *RSF S             2  12.50      .00
                             QWTMMRLJ   SM PERM DIR SEGMENT   0000 *RSF S             1   6.25      .00
                             QWTMESBC   QWTMMRLJ             0201 *RS  S             6  37.50      .01
                             QWTMESBC   SM PERM DIR SEGMENT   0000 *RSF S             1   6.25      .00
                                                                      TOTAL           16
SCPF       QSYS       000000 QDBFEOD    DATA BASE IN-USE TBL 0000 *WS  S             2  15.38      .00
                             QDBFEOD    QHST96213DQHST96213D 0B90 *WS  S             1   7.69      .00
                             QDBFEOD    QHST96213DQHST96213D 0B90 *WSP A             1   7.69      .00
                             QDBFEOD    QHST96213DQHST96213D 0B90 *WSP S             1   7.69      .00
                             QMHRTMSS   QCPFMSG              0E03 *RSF S             2  15.38      .00
                             QDBOPEN    *DESTROYED           0000 *RS  S             1   7.69      .00
                             QDMCLOSE   QHST96213DQHST96213D 0B90 *WS  S             1   7.69      .00
                             QDMCOPEN   QSYS                 0401 *RSF S             1   7.69      .00
                             QLIMROIR   QSYS                 1952 *WSP A             1   7.69      .00
                             QMHLOGER   QHST96213D           1901 *WS  A             1   7.69      .00
                             TOPOFSTACK D1EDE9BC4700          0000 *RSF S             1   7.69      .00
                                                                      TOTAL           13
                             TOPOFSTACK E43BF962E500          0000 *RSF S            12  92.31      .01
```

Figure 99 (Part 14 of 15). I/O by Object Name within Program within Job

```
08/02/96  18:58:45              IO by Object Name within Program within Job              PAGE   28
Process    Job       Job    Program    Object                    PDIO          PDIO     PCT     PCT
job name   user      number            Name/Type                 Oper          Count    Job     ALL
                                                                                        IO      IO
                           TOPOFSTACK FC88D12A5700         0000 *RSF S            1   7.69     .00
                                                                TOTAL            13
QTGTELNETS QTCP      053298 TOPOFSTACK QPXXDISP             0201 *RSF S            2  22.22     .00
                           TOPOFSTACK QTGTNTOC             0201 *RSF S            2  22.22     .00
                           TOPOFSTACK SM PERM DIR SEGMENT  0000 *RSF S            2  22.22     .00
                           QTGTNTOC   QTGTNTOC             0201 *RSF S            2  22.22     .00
                           QTOASND    FC88D12A5700         0000 *RSF S            1  11.11     .00
                                                                TOTAL             9
                           TOPOFSTACK D1EDE9BC4700         0000 *RSF S            3  75.00     .00
                           TOPOFSTACK ILEAGNEW  A960126A   1AEF *RS  S            1  25.00     .00
                                                                TOTAL             4
QSERVER    QSYS      053254 TOPOFSTACK QSERVER   QSYS       1AEF *WS  S            2  66.67     .00
                           QWTMEPJP   QWTPIPJ              0EEF *RSF S            1  33.33     .00
                                                                TOTAL             3
                           TOPOFSTACK *DESTROYED           0000 *RSF S            2 100.00     .00
                           TOPOFSTACK C2D22017B100         0000 *RSF S            1 100.00     .00
                                                                TOTAL             3
                                                                FINAL TOTALS
                                                                TOTAL        94,651
* * *  E N D  O F  R E P O R T  * * *
```

Figure 99 (Part 15 of 15). I/O by Object Name within Program within Job

10.2.22 Report Title - I/O by Object Type within Program within Job

This report is produced from Command Option - By Job/**PGM/Objtype.

```
   IO by Object Type within Program within Job
QUERY NAME . . . . . JPIOOBJ08
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
JPIOOBJ07    PFREXP2      PEXTRACE     JPIOOBJ07
TASKINFO     PFREXP2      PEXTRACE     TASKINFO
DATE . . . . . 08/02/96
TIME . . . . . 18:59:40
       Job/Pgm IO by Object Type - Part 15
```

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 1

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
TSTIOC	A960126A	053543	TESTIO	COMPOSITE PIECE - DATA SPACE	*RX A	11,969	82.23	53.72	12.65
			TESTIO	COMPOSITE PIECE - DATA SPACE	*RSF S	1,455	82.23	6.53	1.54
			TESTIO	PROGRAM	*RSF S	1,446	82.23	6.49	1.53
			TESTIO	COMPOSITE PIECE - DATA SPACE	*RS A	1,370	82.23	6.15	1.45
			TESTIO	*UNKNOWN**************************	*RS S	745	82.23	3.34	.79
			TESTIO	COMPOSITE PIECE - DATA SPACE	*RS S	473	82.23	2.12	.50
			TESTIO	FILE	*RSF S	385	82.23	1.73	.41
			TESTIO	DATA SPACE RUN TIME SID	*RSF S	354	82.23	1.59	.37
			TESTIO	*UNKNOWN**************************	*RSF S	99	82.23	.44	.10
			TESTIO	HOLD RECORD SEG	*RSF S	25	82.23	.11	.03
			TESTIO	WORK CONTROL BLOCK TABLE	*RSF S	1	82.23	.00	.00
			TESTIOC	PROGRAM	*RSF S	1,792	17.67	8.04	1.89
			TESTIOC	LIBRARY	*RSF S	1,246	17.67	5.59	1.32
			TESTIOC	USER PROFILE	*RSF S	404	17.67	1.81	.43
			TESTIOC	TEMPORARY - SPACE	*RSF S	371	17.67	1.67	.39
			TESTIOC	SERVICE PROGRAM	*RSF S	112	17.67	.50	.12
			TESTIOC	PROTECTED SPACE	*RSF S	8	17.67	.04	.01
			TESTIOC	LOCAL DATA AREA	*RSF S	3	17.67	.01	.00
			QCLCLCPR	PROGRAM	*RSF S	9	.06	.04	.01
			QCLCLCPR	LIBRARY	*RSF S	5	.06	.02	.01
			TOPOFSTACK	PROGRAM	*RSF S	3	.02	.01	.00
			TOPOFSTACK	MWS AREA DATA SID	*RSF S	2	.02	.01	.00
			QCADRV	PROTECTED SPACE	*RSF S	2	.01	.01	.00
			QCARULE	PROTECTED SPACE	*RSF S	2	.01	.01	.00
					TOTAL	22,281			
ILEAGNEW	A960126A	053541	ILEAGNEW	HEAP DATA SEGMENT TYPE	*RSF S	4,353	92.47	22.17	4.60
			ILEAGNEW	TEMPORARY - PROCESS CTL SPACE	*RSF S	3,636	92.47	18.51	3.84
			ILEAGNEW	PROGRAM	*RSF S	2,597	92.47	13.22	2.74
			ILEAGNEW	*UNKNOWN**************************	*RSF S	2,064	92.47	10.51	2.18
			ILEAGNEW	SERVICE PROGRAM	*RSF S	2,000	92.47	10.18	2.11
			ILEAGNEW	PROGRAM	*RS S	1,101	92.47	5.61	1.16
			ILEAGNEW	MODUL2 STATIC STORE	*RSF S	730	92.47	3.72	.77
			ILEAGNEW	TEMPORARY - SPACE	*RSF S	561	92.47	2.86	.59
			ILEAGNEW	HEAP CONTROL SEGMENT	*RSF S	280	92.47	1.43	.30

Figure 100 (Part 1 of 9). I/O by Object Type within Program within Job

08/02/96 18:59:40 IO by Object Type within Program within Job PAGE 2

Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
ILEAGNEW	A960126A	053541	ILEAGNEW	JOB MESSAGE QUEUE	*RSF S	274	92.47	1.40	.29
			ILEAGNEW	HOLD RECORD SEG	*RSF S	272	92.47	1.38	.29
			ILEAGNEW	LIBRARY	*RSF S	152	92.47	.77	.16
			ILEAGNEW	TOMBSTONE SEGMENT	*RSF S	113	92.47	.58	.12
			ILEAGNEW	TEMPORARY - PROCESS CTL SPACE	*RS S	16	92.47	.08	.02
			ILEAGNEW	PROTECTED SPACE	*RSF S	7	92.47	.04	.01
			ILEAGNEW	LOCAL DATA AREA	*RSF S	3	92.47	.02	.00
			ILEAGNEW	JOB MESSAGE QUEUE	*WS S	1	92.47	.01	.00
			ILEAGNEW	*UNKNOWN***************************	*WS S	1	92.47	.01	.00
			ILEAGN	TOMBSTONE SEGMENT	*RSF S	510	7.27	2.60	.54
			ILEAGN	TEMPORARY - PROCESS CTL SPACE	*RSF S	454	7.27	2.31	.48
			ILEAGN	PROGRAM	*RSF S	280	7.27	1.43	.30
			ILEAGN	HEAP DATA SEGMENT TYPE	*RSF S	184	7.27	.94	.19
			QWCDLYJB	TEMPORARY - PROCESS CTL SPACE	*WSP S	9	.09	.05	.01
			QWCDLYJB	PROGRAM	*RSF S	6	.09	.03	.01
			QWCDLYJB	ACCESS GROUP	*RSF S	2	.09	.01	.00
			QWCDLYJB	DATA BASE OPERATIONAL CURSOR	*WSP S	1	.09	.01	.00
			QCLCLCPR	PROGRAM	*RSF S	9	.07	.05	.01
			QCLCLCPR	MODUL2 STATIC STORE	*RSF S	2	.07	.01	.00
			QCLCLCPR	LIBRARY	*RSF S	1	.07	.01	.00
			QCLCLCPR	TEMPORARY - PROCESS CTL SPACE	*RS S	1	.07	.01	.00
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*RSF S	6	.07	.03	.01
			TOPOFSTACK	PROGRAM	*RS S	4	.07	.02	.00
			TOPOFSTACK	MWS AREA DATA SID	*RSF S	2	.07	.01	.00
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*RS S	1	.07	.01	.00
			QCADRV	PROGRAM	*RS S	4	.02	.02	.00
			QCARULE	LIBRARY	*RSF S	2	.01	.01	.00
					TOTAL	19,639			
OPENBAD	A960126A	053546	OPEN5	COMPOSITE PIECE - DATA SPACE	*RSF S	2,540	85.71	12.95	2.68
			OPEN5	DATA SPACE RUN TIME SID	*RSF S	2,389	85.71	12.18	2.52
			OPEN5	*UNKNOWN***************************	*RS S	1,856	85.71	9.46	1.96
			OPEN5	PROGRAM	*RSF S	1,815	85.71	9.25	1.92
			OPEN5	*UNKNOWN***************************	*RSF S	1,790	85.71	9.13	1.89
			OPEN5	COMPOSITE PIECE - DATA SPACE	*RS A	1,595	85.71	8.13	1.69

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Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
OPENBAD	A960126A	053546	OPEN5	COMPOSITE PIECE - DATA SPACE	*RS S	1,587	85.71	8.09	1.68
			OPEN5	FILE	*RSF S	1,531	85.71	7.80	1.62
			OPEN5	TEMPORARY - PROCESS CTL SPACE	*RSF S	963	85.71	4.91	1.02
			OPEN5	HOLD RECORD SEG	*RSF S	728	85.71	3.71	.77
			OPEN5	TEMPORARY - PROCESS CTL SPACE	*RS S	13	85.71	.07	.01
			OPEN5	WORK CONTROL BLOCK TABLE	*RSF S	5	85.71	.03	.01
			OPENBAD	PROGRAM	*RSF S	1,508	13.73	7.69	1.59
			OPENBAD	TEMPORARY - SPACE	*RSF S	623	13.73	3.18	.66
			OPENBAD	LIBRARY	*RSF S	257	13.73	1.31	.27
			OPENBAD	TEMPORARY - PROCESS CTL SPACE	*RSF S	224	13.73	1.14	.24
			OPENBAD	PROTECTED SPACE	*RSF S	27	13.73	.14	.03
			OPENBAD	SERVICE PROGRAM	*RSF S	24	13.73	.12	.03
			OPENBAD	TOMBSTONE SEGMENT	*RSF S	15	13.73	.08	.02
			OPENBAD	LOCAL DATA AREA	*RSF S	8	13.73	.04	.01
			OPENBAD	TEMPORARY - PROCESS CTL SPACE	*RS S	6	13.73	.03	.01
			OPENBAD	*UNKNOWN***************************	*RSF S	1	13.73	.01	.00
			QCLCLCPR	PROGRAM	*RSF S	24	.21	.12	.03
			QCLCLCPR	LIBRARY	*RSF S	8	.21	.04	.01
			QCLCLCPR	TEMPORARY - SPACE	*RSF S	8	.21	.04	.01
			QCLCLCPR	*UNKNOWN***************************	*RSF S	1	.21	.01	.00
			TOPOFSTACK	TOMBSTONE SEGMENT	*RSF S	14	.17	.07	.01
			TOPOFSTACK	TEMPORARY - SPACE	*RSF S	7	.17	.04	.01
			TOPOFSTACK	PROGRAM	*RSF S	6	.17	.03	.01
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*RS S	4	.17	.02	.00
			TOPOFSTACK	PROGRAM	*RS S	2	.17	.01	.00
			TOPOFSTACK	MWS AREA DATA SID	*RSF S	1	.17	.01	.00
			QWCDLYJB	TEMPORARY - PROCESS CTL SPACE	*WSP S	16	.12	.08	.02
			QWCDLYJB	ACCESS GROUP	*RSF S	6	.12	.03	.01
			QWCDLYJB	PROGRAM	*RSF S	1	.12	.01	.00
			QCARULE	PROTECTED SPACE	*RSF S	7	.04	.04	.01
			QCARULE	LIBRARY	*RSF S	1	.04	.01	.00
			QCADRV	TEMPORARY - SPACE	*RSF S	3	.03	.02	.00
			QCADRV	PROGRAM	*RS S	2	.03	.01	.00
					TOTAL	19,616			

Figure 100 (Part 2 of 9). I/O by Object Type within Program within Job

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Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
JUNK	QSPLJOB	053464	QCMDEXC	SERVICE PROGRAM	*RSF S	1,215	69.22	23.39	1.28
			QCMDEXC	HEAP DATA SEGMENT TYPE	*RSF S	662	69.22	12.74	.70
			QCMDEXC	TEMPORARY - PROCESS CTL SPACE	*RSF S	462	69.22	8.89	.49
			QCMDEXC	*UNKNOWN**************************	*RSF S	351	69.22	6.76	.37
			QCMDEXC	PROGRAM	*RSF S	232	69.22	4.47	.25
			QCMDEXC	ACTIVATION PROC REF TBL	*RSF S	168	69.22	3.23	.18
			QCMDEXC	MWS AREA DATA SID	*RSF S	143	69.22	2.75	.15
			QCMDEXC	TOMBSTONE SEGMENT	*RSF S	72	69.22	1.39	.08
			QCMDEXC	TEMPORARY - INDEX	*RSF S	60	69.22	1.15	.06
			QCMDEXC	PROGRAM	*RS S	42	69.22	.81	.04
			QCMDEXC	TEMPORARY - PROCESS CTL SPACE	*RS S	41	69.22	.79	.04
			QCMDEXC	MUTEX TEMP SEGMENT	*RSF S	32	69.22	.62	.03
			QCMDEXC	JOB MESSAGE QUEUE	*RSF S	25	69.22	.48	.03
			QCMDEXC	LIBRARY	*RSF S	18	69.22	.35	.02
			QCMDEXC	USER PROFILE	*RSF S	15	69.22	.29	.02
			QCMDEXC	MWS AREA CTL SID	*RSF S	14	69.22	.27	.01
			QCMDEXC	MODUL2 STATIC STORE	*RSF S	14	69.22	.27	.01
			QCMDEXC	CCSID INFORMATION OBJECT	*RSF S	12	69.22	.23	.01
			QCMDEXC	ACCESS GROUP	*RSF S	12	69.22	.23	.01
			QCMDEXC	TEMPORARY - QUEUE	*RSF S	6	69.22	.12	.01
			QDMCOPEN	HEAP DATA SEGMENT TYPE	*RSF S	101	6.14	1.94	.11
			QDMCOPEN	SERVICE PROGRAM	*RSF S	86	6.14	1.66	.09
			QDMCOPEN	TEMPORARY - PROCESS CTL SPACE	*RSF S	35	6.14	.67	.04
			QDMCOPEN	LIBRARY	*RSF S	30	6.14	.58	.03
			QDMCOPEN	USER PROFILE	*RSF S	28	6.14	.54	.03
			QDMCOPEN	MODUL2 STATIC STORE	*RSF S	19	6.14	.37	.02
			QDMCOPEN	FILE	*RSF S	17	6.14	.33	.02
			QDMCOPEN	WORK CONTROL BLOCK TABLE	*RSF S	2	6.14	.04	.00
			QDMCOPEN	PROGRAM	*RSF S	1	6.14	.02	.00
			QDBOPEN	CCSID INFORMATION OBJECT	*RSF S	74	5.20	1.42	.08
			QDBOPEN	PROGRAM	*RSF S	52	5.20	1.00	.05
			QDBOPEN	HOLD RECORD SEG	*RSF S	38	5.20	.73	.04
			QDBOPEN	TEMPORARY - PROCESS CTL SPACE	*RSF S	34	5.20	.65	.04
			QDBOPEN	COMPOSITE PIECE - DATA SPACE	*RSF S	17	5.20	.33	.02
			QDBOPEN	DATA SPACE RUN TIME SID	*RSF S	17	5.20	.33	.02
			QDBOPEN	COMPOSITE PIECE - DATA SPACE INDEX	*RSF S	16	5.20	.31	.02

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Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
JUNK	QSPLJOB	053464	QDBOPEN	FILE FORMAT	*RSF S	13	5.20	.25	.01
			QDBOPEN	*UNKNOWN**************************	*RSF S	6	5.20	.12	.01
			QDBOPEN	TEMPORARY - PROCESS CTL SPACE	*RS S	3	5.20	.06	.00
			QDBGETKY	COMPOSITE PIECE - DATA SPACE INDEX	*RSF S	39	3.54	.75	.04
			QDBGETKY	COMPOSITE PIECE - DATA SPACE	*RS S	29	3.54	.56	.03
			QDBGETKY	*UNKNOWN**************************	*RSF S	28	3.54	.54	.03
			QDBGETKY	DATA SPACE INDEX RUN TIME	*RSF S	25	3.54	.48	.03
			QDBGETKY	COMPOSITE PIECE - DATA SPACE	*RSF S	23	3.54	.44	.02
			QDBGETKY	TEMPORARY - PROCESS CTL SPACE	*RSF S	16	3.54	.31	.02
			QDBGETKY	COMPOSITE PIECE - DATA SPACE	*RS A	12	3.54	.23	.01
			QDBGETKY	DATA SPACE RUN TIME SID	*RSF S	12	3.54	.23	.01
			QMHSNDPM	MESSAGE FILE	*RSF S	56	2.77	1.08	.06
			QMHSNDPM	JOB MESSAGE QUEUE	*RSF S	47	2.77	.90	.05
			QMHSNDPM	LIBRARY	*RSF S	18	2.77	.35	.02
			QMHSNDPM	PROGRAM	*RSF S	6	2.77	.12	.01
			QMHSNDPM	MODUL2 STATIC STORE	*RSF S	6	2.77	.12	.01
			QMHSNDPM	HEAP DATA SEGMENT TYPE	*RSF S	5	2.77	.10	.01
			QMHSNDPM	TEMPORARY - PROCESS CTL SPACE	*RSF S	4	2.77	.08	.00
			QMHSNDPM	TEMPORARY - PROCESS CTL SPACE	*RS S	1	2.77	.02	.00
			QMHSNDPM	TOMBSTONE SEGMENT	*RSF S	1	2.77	.02	.00
			TOPOFSTACK	PROGRAM	*RSF S	26	1.75	.50	.03
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*RSF S	21	1.75	.40	.02
			TOPOFSTACK	SERVICE PROGRAM	*RSF S	18	1.75	.35	.02
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*RSF S	13	1.75	.25	.01
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*RS S	10	1.75	.19	.01
			TOPOFSTACK	JOB MESSAGE QUEUE	*RSF S	2	1.75	.04	.00
			TOPOFSTACK	TOMBSTONE SEGMENT	*RSF S	1	1.75	.02	.00
			QMHRSNEM	PROGRAM	*RSF S	31	1.17	.60	.03
			QMHRSNEM	MODUL2 STATIC STORE	*RSF S	9	1.17	.17	.01
			QMHRSNEM	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	1.17	.12	.01
			QMHRSNEM	JOB MESSAGE QUEUE	*RSF S	6	1.17	.12	.01
			QMHRSNEM	HEAP DATA SEGMENT TYPE	*RSF S	6	1.17	.12	.01
			QMHRSNEM	TOMBSTONE SEGMENT	*RSF S	3	1.17	.06	.00
			QLIDLOBJ	JOB MESSAGE QUEUE	*RSF S	17	1.02	.33	.02
			QLIDLOBJ	TOMBSTONE SEGMENT	*RSF S	12	1.02	.23	.01
			QLIDLOBJ	PROGRAM	*RSF S	6	1.02	.12	.01

Figure 100 (Part 3 of 9). I/O by Object Type within Program within Job

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Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
JUNK	QSPLJOB	053464	QLIDLOBJ	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	1.02	.12	.01
			QLIDLOBJ	MODUL2 STATIC STORE	*RSF S	6	1.02	.12	.01
			QLIDLOBJ	HEAP DATA SEGMENT TYPE	*RSF S	6	1.02	.12	.01
			QCATRS	PROGRAM	*RSF S	26	.77	.50	.03
			QCATRS	LIBRARY	*RSF S	14	.77	.27	.01
			QDMCLOSE	COMPOSITE PIECE - DATA SPACE	*RSF S	12	.69	.23	.01
			QDMCLOSE	COMPOSITE PIECE - DATA SPACE INDEX	*RSF S	12	.69	.23	.01
			QDMCLOSE	DATA SPACE RUN TIME SID	*RSF S	12	.69	.23	.01
			QMHMOVPM	JOB MESSAGE QUEUE	*RSF S	25	.69	.48	.03
			QMHMOVPM	TOMBSTONE SEGMENT	*RSF S	7	.69	.13	.01
			QMHMOVPM	TEMPORARY - PROCESS CTL SPACE	*RSF S	4	.69	.08	.00
			QSQENDAG	TEMPORARY - PROCESS CTL SPACE	*RSF S	20	.69	.38	.02
			QSQENDAG	MODUL2 STATIC STORE	*RSF S	6	.69	.12	.01
			QSQENDAG	HEAP DATA SEGMENT TYPE	*RSF S	6	.69	.12	.01
			QSQENDAG	PROGRAM	*RSF S	2	.69	.04	.00
			QSQENDAG	JOB MESSAGE QUEUE	*RSF S	2	.69	.04	.00
			QLICHLLE	PROGRAM	*RSF S	13	.62	.25	.01
			QLICHLLE	HOLD RECORD SEG	*RSF S	12	.62	.23	.01
			QLICHLLE	LIBRARY	*RSF S	7	.62	.13	.01
			QWCDLYJB	TEMPORARY - PROCESS CTL SPACE	*WS S	12	.60	.23	.01
			QWCDLYJB	PROGRAM	*RSF S	6	.60	.12	.01
			QWCDLYJB	TEMPORARY - PROCESS CTL SPACE	*WSP S	6	.60	.12	.01
			QWCDLYJB	ACCESS GROUP	*RSF S	6	.60	.12	.01
			QWCDLYJB	TEMPORARY - PROCESS CTL SPACE	*RS S	1	.60	.02	.00
			QCANPARS	CCSID INFORMATION OBJECT	*RSF S	24	.58	.46	.03
			QCANPARS	HOLD RECORD SEG	*RSF S	6	.58	.12	.01
			QCADRV2	PROGRAM	*RS S	26	.56	.50	.03
			QCADRV2	TEMPORARY - PROCESS CTL SPACE	*RSF S	2	.56	.04	.00
			QCADRV2	HOLD RECORD SEG	*RSF S	1	.56	.02	.00
			QMHPDEH	JOB MESSAGE QUEUE	*RSF S	15	.52	.29	.02
			QMHPDEH	TEMPORARY - PROCESS CTL SPACE	*RSF S	12	.52	.23	.01
			QCACHLBL	PROGRAM	*RS S	12	.48	.23	.01
			QCACHLBL	PROGRAM	*RSF S	6	.48	.12	.01
			QCACHLBL	*UNKNOWN**************************	*RSF S	6	.48	.12	.01
			QCACHLBL	HOLD RECORD SEG	*RSF S	1	.48	.02	.00
			QCAIEXIT	*UNKNOWN**************************	*RSF S	12	.48	.23	.01

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Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
JUNK	QSPLJOB	053464	QCAIEXIT	PROGRAM	*RSF S	6	.48	.12	.01
			QCAIEXIT	USER PROFILE	*RSF S	6	.48	.12	.01
			QCAIEXIT	HOLD RECORD SEG	*RSF S	1	.48	.02	.00
			QUSRJOBI	TEMPORARY - PROCESS CTL SPACE	*RSF S	16	.42	.31	.02
			QUSRJOBI	SPOOL CTL BLOCK	*RSF S	6	.42	.12	.01
			QMHCHGEM	PROGRAM	*RSF S	7	.27	.13	.01
			QMHCHGEM	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	.27	.12	.01
			QMHCHGEM	MODUL2 STATIC STORE	*RSF S	1	.27	.02	.00
			QDBCLOSE	*UNKNOWN**************************	*RSF S	12	.25	.23	.01
			QDBCLOSE	HOLD RECORD SEG	*RSF S	1	.25	.02	.00
			QUSDLTUS	TEMPORARY - PROCESS CTL SPACE	*RSF S	7	.25	.13	.01
			QUSDLTUS	PROGRAM	*RSF S	6	.25	.12	.01
			QDCXLATE	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	.23	.12	.01
			QDCXLATE	TABLE	*RSF S	6	.23	.12	.01
			QDMRCLSE	PROGRAM	*RS S	5	.21	.10	.01
			QDMRCLSE	PROGRAM	*RSF S	5	.21	.10	.01
			QDMRCLSE	TEMPORARY - PROCESS CTL SPACE	*RSF S	1	.21	.02	.00
			QMHRCVPM	TEMPORARY - PROCESS CTL SPACE	*RSF S	8	.15	.15	.01
			QTMPCKP	PROGRAM	*RSF S	7	.13	.13	.01
			QCARULE	LIBRARY	*RSF S	6	.12	.12	.01
			QLICNV	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	.12	.12	.01
			QMHRTMSS	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	.12	.12	.01
			QTQGESP	TEMPORARY - PROCESS CTL SPACE	*RSF S	6	.12	.12	.01
			QUIRCLAP	TEMPORARY - PROCESS CTL SPACE	*RSF S	4	.08	.08	.00
			QCAIFLD	TEMPORARY - PROCESS CTL SPACE	*RSF S	2	.04	.04	.00
					TOTAL	5,195			
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WSP S	870	100.00	22.13	.92
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*WSP S	562	100.00	14.29	.59
			TOPOFSTACK	DATA SPACE RUN TIME SID	*WSP S	540	100.00	13.73	.57
			TOPOFSTACK	*UNKNOWN**************************	*WSP S	530	100.00	13.48	.56
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE	*WSP S	498	100.00	12.67	.53
			TOPOFSTACK	HOLD RECORD SEG	*WSP S	185	100.00	4.70	.20
			TOPOFSTACK	TEMPORARY - SPACE	*WSP S	160	100.00	4.07	.17
			TOPOFSTACK	PROGRAM	*WSP S	141	100.00	3.59	.15

Figure 100 (Part 4 of 9). I/O by Object Type within Program within Job

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Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
			TOPOFSTACK	TOMBSTONE SEGMENT	*WSP S	128	100.00	3.26	.14
			TOPOFSTACK	SERVICE PROGRAM	*WSP S	118	100.00	3.00	.12
			TOPOFSTACK	JOB MESSAGE QUEUE	*WSP S	84	100.00	2.14	.09
			TOPOFSTACK	HEAP CONTROL SEGMENT	*WSP S	37	100.00	.94	.04
			TOPOFSTACK	MODUL2 STATIC STORE	*WSP S	34	100.00	.86	.04
			TOPOFSTACK	MWS AREA DATA SID	*WSP S	13	100.00	.33	.01
			TOPOFSTACK	PROTECTED SPACE	*WSP S	9	100.00	.23	.01
			TOPOFSTACK	CCSID INFORMATION OBJECT	*WSP S	6	100.00	.15	.01
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE INDEX	*WSP S	5	100.00	.13	.01
			TOPOFSTACK	TEMPORARY - QUEUE	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	ACCESS GROUP	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	MWS AREA CTL SID	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	DATA SPACE INDEX RUN TIME	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	TEMPORARY - INDEX	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	MESSAGE FILE	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	LIBRARY	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	MUTEX TEMP SEGMENT	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WSP S	910	100.00	23.62	.96
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*WSP S	551	100.00	14.30	.58
			TOPOFSTACK	*UNKNOWN**************************	*WSP S	506	100.00	13.13	.53
			TOPOFSTACK	DATA SPACE RUN TIME SID	*WSP S	480	100.00	12.46	.51
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE	*WSP S	476	100.00	12.35	.50
			TOPOFSTACK	HOLD RECORD SEG	*WSP S	164	100.00	4.26	.17
			TOPOFSTACK	TEMPORARY - SPACE	*WSP S	148	100.00	3.84	.16
			TOPOFSTACK	PROGRAM	*WSP S	139	100.00	3.61	.15
			TOPOFSTACK	TOMBSTONE SEGMENT	*WSP S	119	100.00	3.09	.13
			TOPOFSTACK	SERVICE PROGRAM	*WSP S	115	100.00	2.98	.12
			TOPOFSTACK	JOB MESSAGE QUEUE	*WSP S	90	100.00	2.34	.10
			TOPOFSTACK	HEAP CONTROL SEGMENT	*WSP S	56	100.00	1.45	.06
			TOPOFSTACK	MODUL2 STATIC STORE	*WSP S	44	100.00	1.14	.05
			TOPOFSTACK	MWS AREA DATA SID	*WSP S	23	100.00	.60	.02
			TOPOFSTACK	PROTECTED SPACE	*WSP S	7	100.00	.18	.01
			TOPOFSTACK	MUTEX TEMP SEGMENT	*WSP S	6	100.00	.16	.01
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE INDEX	*WSP S	4	100.00	.10	.00
			TOPOFSTACK	CCSID INFORMATION OBJECT	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	ACCESS GROUP	*WSP S	3	100.00	.08	.00

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Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
			TOPOFSTACK	DATA SPACE INDEX RUN TIME	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	LIBRARY	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	MWS AREA CTL SID	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	TEMPORARY - INDEX	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	MESSAGE FILE	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WSP S	945	100.00	25.08	1.00
			TOPOFSTACK	*UNKNOWN**************************	*WSP S	490	100.00	13.00	.52
			TOPOFSTACK	DATA SPACE RUN TIME SID	*WSP S	489	100.00	12.98	.52
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*WSP S	461	100.00	12.23	.49
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE	*WSP S	444	100.00	11.78	.47
			TOPOFSTACK	HOLD RECORD SEG	*WSP S	207	100.00	5.49	.22
			TOPOFSTACK	TEMPORARY - SPACE	*WSP S	136	100.00	3.61	.14
			TOPOFSTACK	TOMBSTONE SEGMENT	*WSP S	135	100.00	3.58	.14
			TOPOFSTACK	SERVICE PROGRAM	*WSP S	124	100.00	3.29	.13
			TOPOFSTACK	PROGRAM	*WSP S	116	100.00	3.08	.12
			TOPOFSTACK	JOB MESSAGE QUEUE	*WSP S	94	100.00	2.49	.10
			TOPOFSTACK	MODUL2 STATIC STORE	*WSP S	43	100.00	1.14	.05
			TOPOFSTACK	HEAP CONTROL SEGMENT	*WSP S	34	100.00	.90	.04
			TOPOFSTACK	MWS AREA DATA SID	*WSP S	15	100.00	.40	.02
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE INDEX	*WSP S	11	100.00	.29	.01
			TOPOFSTACK	PROTECTED SPACE	*WSP S	7	100.00	.19	.01
			TOPOFSTACK	DATA SPACE INDEX RUN TIME	*WSP S	6	100.00	.16	.01
			TOPOFSTACK	ACCESS GROUP	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	MWS AREA CTL SID	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	CCSID INFORMATION OBJECT	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	MUTEX TEMP SEGMENT	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	TEMPORARY - INDEX	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WSP S	876	100.00	23.69	.93
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*WSP S	540	100.00	14.60	.57
			TOPOFSTACK	DATA SPACE RUN TIME SID	*WSP S	507	100.00	13.71	.54
			TOPOFSTACK	*UNKNOWN**************************	*WSP S	457	100.00	12.36	.48
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE	*WSP S	427	100.00	11.55	.45
			TOPOFSTACK	HOLD RECORD SEG	*WSP S	169	100.00	4.57	.18
			TOPOFSTACK	PROGRAM	*WSP S	146	100.00	3.95	.15
			TOPOFSTACK	TEMPORARY - SPACE	*WSP S	126	100.00	3.41	.13
			TOPOFSTACK	TOMBSTONE SEGMENT	*WSP S	118	100.00	3.19	.12

Figure 100 (Part 5 of 9). I/O by Object Type within Program within Job

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Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
			TOPOFSTACK	JOB MESSAGE QUEUE	*WSP S	107	100.00	2.89	.11
			TOPOFSTACK	SERVICE PROGRAM	*WSP S	105	100.00	2.84	.11
			TOPOFSTACK	MODUL2 STATIC STORE	*WSP S	44	100.00	1.19	.05
			TOPOFSTACK	HEAP CONTROL SEGMENT	*WSP S	38	100.00	1.03	.04
			TOPOFSTACK	MWS AREA DATA SID	*WSP S	10	100.00	.27	.01
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE INDEX	*WSP S	7	100.00	.19	.01
			TOPOFSTACK	CCSID INFORMATION OBJECT	*WSP S	6	100.00	.16	.01
			TOPOFSTACK	PROTECTED SPACE	*WSP S	5	100.00	.14	.01
			TOPOFSTACK	LIBRARY	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	TEMPORARY - INDEX	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	MUTEX TEMP SEGMENT	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	TEMPORARY - QUEUE	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	MESSAGE FILE	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	DATA SPACE INDEX RUN TIME	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WSP S	871	100.00	23.73	.92
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*WSP S	522	100.00	14.22	.55
			TOPOFSTACK	*UNKNOWN**************************	*WSP S	484	100.00	13.19	.51
			TOPOFSTACK	DATA SPACE RUN TIME SID	*WSP S	461	100.00	12.56	.49
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE	*WSP S	416	100.00	11.34	.44
			TOPOFSTACK	PROGRAM	*WSP S	151	100.00	4.11	.16
			TOPOFSTACK	TOMBSTONE SEGMENT	*WSP S	149	100.00	4.06	.16
			TOPOFSTACK	TEMPORARY - SPACE	*WSP S	147	100.00	4.01	.16
			TOPOFSTACK	HOLD RECORD SEG	*WSP S	146	100.00	3.98	.15
			TOPOFSTACK	SERVICE PROGRAM	*WSP S	110	100.00	3.00	.12
			TOPOFSTACK	JOB MESSAGE QUEUE	*WSP S	83	100.00	2.26	.09
			TOPOFSTACK	MODUL2 STATIC STORE	*WSP S	40	100.00	1.09	.04
			TOPOFSTACK	HEAP CONTROL SEGMENT	*WSP S	39	100.00	1.06	.04
			TOPOFSTACK	MWS AREA DATA SID	*WSP S	17	100.00	.46	.02
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE INDEX	*WSP S	6	100.00	.16	.01
			TOPOFSTACK	CCSID INFORMATION OBJECT	*WSP S	6	100.00	.16	.01
			TOPOFSTACK	DATA SPACE INDEX RUN TIME	*WSP S	6	100.00	.16	.01
			TOPOFSTACK	PROTECTED SPACE	*WSP S	5	100.00	.14	.01
			TOPOFSTACK	MUTEX TEMP SEGMENT	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	TEMPORARY - QUEUE	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	TEMPORARY - INDEX	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	MWS AREA CTL SID	*WSP S	2	100.00	.05	.00

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Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
			TOPOFSTACK	MESSAGE FILE	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	ACCESS GROUP	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WSP S	859	100.00	23.45	.91
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*WSP S	529	100.00	14.44	.56
			TOPOFSTACK	DATA SPACE RUN TIME SID	*WSP S	487	100.00	13.30	.51
			TOPOFSTACK	*UNKNOWN**************************	*WSP S	481	100.00	13.13	.51
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE	*WSP S	403	100.00	11.00	.43
			TOPOFSTACK	HOLD RECORD SEG	*WSP S	158	100.00	4.31	.17
			TOPOFSTACK	TEMPORARY - SPACE	*WSP S	151	100.00	4.12	.16
			TOPOFSTACK	PROGRAM	*WSP S	133	100.00	3.63	.14
			TOPOFSTACK	SERVICE PROGRAM	*WSP S	124	100.00	3.39	.13
			TOPOFSTACK	TOMBSTONE SEGMENT	*WSP S	124	100.00	3.39	.13
			TOPOFSTACK	JOB MESSAGE QUEUE	*WSP S	84	100.00	2.29	.09
			TOPOFSTACK	MODUL2 STATIC STORE	*WSP S	43	100.00	1.17	.05
			TOPOFSTACK	HEAP CONTROL SEGMENT	*WSP S	39	100.00	1.06	.04
			TOPOFSTACK	MWS AREA DATA SID	*WSP S	15	100.00	.41	.02
			TOPOFSTACK	PROTECTED SPACE	*WSP S	7	100.00	.19	.01
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE INDEX	*WSP S	5	100.00	.14	.01
			TOPOFSTACK	DATA SPACE INDEX RUN TIME	*WSP S	5	100.00	.14	.01
			TOPOFSTACK	CCSID INFORMATION OBJECT	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	MWS AREA CTL SID	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	MUTEX TEMP SEGMENT	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	TEMPORARY - QUEUE	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	TEMPORARY - INDEX	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	ACCESS GROUP	*WSP S	2	100.00	.05	.00
			TOPOFSTACK	MESSAGE FILE	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*WSP S	868	100.00	23.77	.92
			TOPOFSTACK	HEAP DATA SEGMENT TYPE	*WSP S	527	100.00	14.43	.56
			TOPOFSTACK	DATA SPACE RUN TIME SID	*WSP S	478	100.00	13.09	.51
			TOPOFSTACK	*UNKNOWN**************************	*WSP S	440	100.00	12.05	.46
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE	*WSP S	412	100.00	11.28	.44
			TOPOFSTACK	HOLD RECORD SEG	*WSP S	162	100.00	4.44	.17
			TOPOFSTACK	TEMPORARY - SPACE	*WSP S	159	100.00	4.35	.17
			TOPOFSTACK	SERVICE PROGRAM	*WSP S	135	100.00	3.70	.14
			TOPOFSTACK	PROGRAM	*WSP S	125	100.00	3.42	.13
			TOPOFSTACK	TOMBSTONE SEGMENT	*WSP S	113	100.00	3.10	.12

Figure 100 (Part 6 of 9). I/O by Object Type within Program within Job

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Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
			TOPOFSTACK	JOB MESSAGE QUEUE	*WSP S	85	100.00	2.33	.09
			TOPOFSTACK	MODUL2 STATIC STORE	*WSP S	54	100.00	1.48	.06
			TOPOFSTACK	HEAP CONTROL SEGMENT	*WSP S	38	100.00	1.04	.04
			TOPOFSTACK	MWS AREA DATA SID	*WSP S	20	100.00	.55	.02
			TOPOFSTACK	PROTECTED SPACE	*WSP S	8	100.00	.22	.01
			TOPOFSTACK	CCSID INFORMATION OBJECT	*WSP S	5	100.00	.14	.01
			TOPOFSTACK	MWS AREA CTL SID	*WSP S	5	100.00	.14	.01
			TOPOFSTACK	DATA SPACE INDEX RUN TIME	*WSP S	4	100.00	.11	.00
			TOPOFSTACK	MUTEX TEMP SEGMENT	*WSP S	4	100.00	.11	.00
			TOPOFSTACK	COMPOSITE PIECE - DATA SPACE INDEX	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	TEMPORARY - INDEX	*WSP S	3	100.00	.08	.00
			TOPOFSTACK	MESSAGE FILE	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	LIBRARY	*WSP S	1	100.00	.03	.00
			TOPOFSTACK	ACCESS GROUP	*WSP S	1	100.00	.03	.00
					TOTAL	26,235			
P23ARTVKE	A960126A	053319	QWTCCRLJ	WORK CONTROL BLOCK TABLE	*RX A	1,062	81.93	80.27	1.12
			QWTCCRLJ	WORK CONTROL BLOCK TABLE	*RSF S	7	81.93	.53	.01
			QWTCCRLJ	SPOOL CTL BLOCK	*RSF S	3	81.93	.23	.00
			QWTCCRLJ	WORK CONTROL BLOCK TABLE	*RS A	3	81.93	.23	.00
			QWTCCRLJ	WORK CONTROL BLOCK TABLE	*RS S	3	81.93	.23	.00
			QWTCCRLJ	PROGRAM	*RSF S	2	81.93	.15	.00
			QWTCCRLJ	MWS AREA DATA SID	*RSF S	2	81.93	.15	.00
			QWTCCRLJ	PROGRAM	*RS S	1	81.93	.08	.00
			QWTCCRLJ	*UNKNOWN**************************	*RSF S	1	81.93	.08	.00
			TOPOFSTACK	WORK CONTROL BLOCK TABLE	*RSF S	89	12.77	6.73	.09
			TOPOFSTACK	TEMPORARY - PROCESS CTL SPACE	*RSF S	74	12.77	5.59	.08
			TOPOFSTACK	HOLD RECORD SEG	*RSF S	2	12.77	.15	.00
			TOPOFSTACK	*UNKNOWN**************************	*RSF S	2	12.77	.15	.00
			TOPOFSTACK	TEMPORARY - ACCESS GROUP	*RSF S	1	12.77	.08	.00
			TOPOFSTACK	SUBSYSTEM DESCRIPTION	*RSF S	1	12.77	.08	.00
			QMHSNDPM	JOB MESSAGE QUEUE	*RSF S	9	1.06	.68	.01
			QMHSNDPM	MESSAGE FILE	*RSF S	2	1.06	.15	.00
			QMHSNDPM	PROGRAM	*RSF S	2	1.06	.15	.00
			QMHSNDPM	*UNKNOWN**************************	*RSF S	1	1.06	.08	.00

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Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
P23ARTVKE	A960126A	053319	QMHSNSTQ	MESSAGE QUEUE	*WS A	6	1.06	.45	.01
			QMHSNSTQ	WORK CONTROL BLOCK TABLE	*RSF S	3	1.06	.23	.00
			QMHSNSTQ	MESSAGE QUEUE	*WS S	3	1.06	.23	.00
			QMHSNSTQ	PROGRAM	*RSF S	1	1.06	.08	.00
			QMHSNSTQ	MESSAGE QUEUE	*RSF S	1	1.06	.08	.00
			QUIMGFLW	PANEL GROUP DEFINITION	*RSF S	6	.83	.45	.01
			QUIMGFLW	PROGRAM	*RS S	2	.83	.15	.00
			QUIMGFLW	TEMPORARY - SPACE	*RS S	2	.83	.15	.00
			QUIMGFLW	*UNKNOWN**************************	*RSF S	1	.83	.08	.00
			QUICMD	PROGRAM	*RS S	4	.45	.30	.00
			QUICMD	PROGRAM	*RSF S	1	.45	.08	.00
			QUICMD	*UNKNOWN**************************	*RSF S	1	.45	.08	.00
			QWCCDSTC	*UNKNOWN**************************	*RSF S	3	.38	.23	.00
			QWCCDSTC	PROGRAM	*RS S	2	.38	.15	.00
			QSPCHJOB	SPOOL CTL BLOCK	*WS S	3	.30	.23	.00
			QSPCHJOB	HOLD RECORD SEG	*RSF S	1	.30	.08	.00
			QUIICHK	PANEL GROUP DEFINITION	*RSF S	2	.23	.15	.00
			QUIICHK	PROGRAM	*RSF S	1	.23	.08	.00
			QCARULE	COMMAND	*RSF S	1	.15	.08	.00
			QCARULE	*UNKNOWN**************************	*RSF S	1	.15	.08	.00
			QEZWRAST	PROGRAM	*RSF S	1	.15	.08	.00
			QEZWRAST	*UNKNOWN**************************	*RSF S	1	.15	.08	.00
			QUIEXFMT	PANEL GROUP DEFINITION	*RSF S	2	.15	.15	.00
			QUIINMGR	TEMPORARY - SPACE	*RSF S	2	.15	.15	.00
			QCATRS	COMMAND	*WS A	1	.08	.08	.00
			QUIALIST	PROGRAM	*RSF S	1	.08	.08	.00
			QUILIST	TEMPORARY - SPACE	*RSF S	1	.08	.08	.00
			QUIVPMGR	PANEL GROUP DEFINITION	*RSF S	1	.08	.08	.00
			QWCSHUIC	PROGRAM	*RSF S	1	.08	.08	.00
					TOTAL	1,323			
PEXTRACE	A960126A	053555	QSPRCMBR	COMPOSITE PIECE - DATA SPACE	*WS S	25	15.95	8.31	.03
			QSPRCMBR	SPOOL CTL BLOCK	*WSP S	7	15.95	2.33	.01
			QSPRCMBR	DB IN USE TABLE	*WS S	6	15.95	1.99	.01
			QSPRCMBR	COMPOSITE PIECE - DATA SPACE	*WSP S	5	15.95	1.66	.01

Figure 100 (Part 7 of 9). I/O by Object Type within Program within Job

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Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
PEXTRACE	A960126A	053555	QSPRCMBR	*UNKNOWN**********	*RSF S	2	15.95	.66	.00
			QSPRCMBR	COMPOSITE PIECE - DATA SPACE	*RSF S	1	15.95	.33	.00
			QSPRCMBR	FILE AVAIL CTL BLOCK	*RSF S	1	15.95	.33	.00
			QSPRCMBR	PROGRAM	*RSF S	1	15.95	.33	.00
			QSPOPEN	PRINT QUEUE	*RSF S	12	13.95	3.99	.01
			QSPOPEN	SPOOL CTL BLOCK	*WSP S	10	13.95	3.32	.01
			QSPOPEN	OUTPUT QUEUE	*WS S	5	13.95	1.66	.01
			QSPOPEN	*UNKNOWN**********	*RSF S	4	13.95	1.33	.00
			QSPOPEN	HOLD RECORD SEG	*RSF S	3	13.95	1.00	.00
			QSPOPEN	OUTPUT QUEUE	*RSF S	2	13.95	.66	.00
			QSPOPEN	PROGRAM	*RS S	2	13.95	.66	.00
			QSPOPEN	USER PROFILE	*RSF S	1	13.95	.33	.00
			QSPOPEN	SPOOL CTL BLOCK	*WS S	1	13.95	.33	.00
			QSPOPEN	CHANGED PAGE BITMAP	*RSF S	1	13.95	.33	.00
			QSPOPEN	*UNKNOWN**********	*WS S	1	13.95	.33	.00
			QSPCLOSE	COMPOSITE PIECE - DATA SPACE	*WSP A	10	11.30	3.32	.01
			QSPCLOSE	SPOOL CTL BLOCK	*WSP S	6	11.30	1.99	.01
			QSPCLOSE	DB IN USE TABLE	*WS S	6	11.30	1.99	.01
			QSPCLOSE	COMPOSITE PIECE - DATA SPACE	*WS S	5	11.30	1.66	.01
			QSPCLOSE	OUTPUT QUEUE	*WS S	5	11.30	1.66	.01
			QSPCLOSE	COMPOSITE PIECE - DATA SPACE	*RSF S	1	11.30	.33	.00
			QSPCLOSE	PROGRAM	*RSF S	1	11.30	.33	.00
			QDBCRTME	LIBRARY	*WS S	6	10.63	1.99	.01
			QDBCRTME	COMPOSITE PIECE - DATA SPACE	*WS A	4	10.63	1.33	.00
			QDBCRTME	USER PROFILE	*WS S	4	10.63	1.33	.00
			QDBCRTME	*UNKNOWN**********	*RSF S	4	10.63	1.33	.00
			QDBCRTME	USER PROFILE	*RSF S	3	10.63	1.00	.00
			QDBCRTME	DATA BASE FILE MEMBER	*WS A	2	10.63	.66	.00
			QDBCRTME		*RSF S	2	10.63	.66	.00
			QDBCRTME	*UNKNOWN**********	*WS A	2	10.63	.66	.00
			QDBCRTME	*UNKNOWN**********	*WS S	2	10.63	.66	.00
			QDBCRTME	DATA BASE FILE MEMBER	*WS S	1	10.63	.33	.00
			QDBCRTME	FILE	*WS A	1	10.63	.33	.00
			QDBCRTME	DATA SPACE RUN TIME SID	*RSF S	1	10.63	.33	.00
			QWCCDSTC	*UNKNOWN**********	*RSF S	10	5.65	3.32	.01
			QWCCDSTC	MWS AREA DATA SID	*RSF S	5	5.65	1.66	.01

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Process job name	Job user	Job number	Program	Object Description	PDIO Oper	PDIO Count	PCT PGM IO of JOB IO	PCT Job IO	PCT ALL IO
PEXTRACE	A960126A	053555	QWCCDSTC	PROGRAM	*RS S	2	5.65	.66	.00
			TOPOFSTACK	SERVICE PROGRAM	*RSF S	5	5.32	1.66	.01
			TOPOFSTACK	PROGRAM	*RS S	4	5.32	1.33	.00
			TOPOFSTACK	PROGRAM	*RSF S	4	5.32	1.33	.00
			TOPOFSTACK	*UNKNOWN**********	*RSF S	3	5.32	1.00	.00
			QDBFEOD	COMPOSITE PIECE - DATA SPACE	*WS S	6	4.65	1.99	.01
			QDBFEOD	COMPOSITE PIECE - DATA SPACE	*WSP S	3	4.65	1.00	.00
			QDBFEOD	DB IN USE TABLE	*WS S	3	4.65	1.00	.00
			QDBFEOD	COMPOSITE PIECE - DATA SPACE	*WSP A	1	4.65	.33	.00
			QDBFEOD	*UNKNOWN**********	*WS S	1	4.65	.33	.00
			QUIMGFLW	TEMPORARY - SPACE	*RS S	9	4.65	2.99	.01
			QUIMGFLW	PROGRAM	*RSF S	2	4.65	.66	.00
			QUIMGFLW	PANEL GROUP DEFINITION	*RSF S	2	4.65	.66	.00
			QUIMGFLW	TEMPORARY - SPACE	*RSF S	1	4.65	.33	.00
			QSPCNSPF	OUTPUT QUEUE	*WS S	5	3.32	1.66	.01
			QSPCNSPF	PROGRAM	*RSF S	4	3.32	1.33	.00
			QSPCNSPF	*UNKNOWN**********	*RSF S	1	3.32	.33	.00
			QUIPRINT	TEMPORARY - SPACE	*RS S	7	3.32	2.33	.01
			QUIPRINT	TEMPORARY - SPACE	*RSF S	2	3.32	.66	.00
			QUIPRINT	PANEL GROUP DEFINITION	*RSF S	1	3.32	.33	.00
			QSPCPYF	PROGRAM	*RSF S	4	2.66	1.33	.00
			QSPCPYF	PROGRAM	*RS S	2	2.66	.66	.00
			QSPCPYF	LIBRARY	*RSF S	1	2.66	.33	.00
			QSPCPYF	*UNKNOWN**********	*RSF S	1	2.66	.33	.00
			QCARULE	LIBRARY	*RSF S	4	1.99	1.33	.00
			QCARULE	COMMAND	*RSF S	2	1.99	.66	.00
			QDMCLOSE	COMPOSITE PIECE - DATA SPACE	*WS S	3	1.99	1.00	.00
			QDMCLOSE	COMPOSITE PIECE - DATA SPACE	*WS A	1	1.99	.33	.00
			QDMCLOSE	PROGRAM	*RS S	1	1.99	.33	.00
			QDMCLOSE	*UNKNOWN**********	*RSF S	1	1.99	.33	.00
			QWPALLOC	PROGRAM	*RSF S	6	1.99	1.99	.01
			QCANPARS	CCSID INFORMATION OBJECT	*RSF S	4	1.66	1.33	.00
			QCANPARS	HOLD RECORD SEG	*RSF S	1	1.66	.33	.00
			QSYGRTSA	USER PROFILE	*RSF S	3	1.66	1.00	.00
			QSYGRTSA	COMPOSITE PIECE - DATA SPACE	*WSP S	1	1.66	.33	.00
			QSYGRTSA	DATA BASE FILE MEMBER	*WSP S	1	1.66	.33	.00

Figure 100 (Part 8 of 9). I/O by Object Type within Program within Job

```
08/02/96  18:59:40                      IO by Object Type within Program within Job                      PAGE   16
Process    Job        Job    Program    Object                              PDIO          PDIO  PCT          PCT     PCT
job name   user       number            Description                         Oper          Count PGM IO       Job     ALL
                                                                                                of JOB IO    IO      IO
PEXTRACE   A960126A   053555 QDMCOPEN   PROGRAM                             *RSF S            1     1.33     .33     .00
                             QDMCOPEN   LIBRARY                             *RSF S            1     1.33     .33     .00
                             QDMCOPEN   HEAP DATA SEGMENT TYPE              *RSF S            1     1.33     .33     .00
                             QDMCOPEN   *UNKNOWN************************** *RSF S            1     1.33     .33     .00
                             QCATRS     PROGRAM                             *RSF S            2     1.00     .66     .00
                             QCATRS     *UNKNOWN************************** *RSF S            1     1.00     .33     .00
                             QUICLOSE   PROGRAM                             *RSF S            2     1.00     .66     .00
                             QUICLOSE   *UNKNOWN************************** *RSF S            1     1.00     .33     .00
                             QCADRV     PROGRAM                             *RS  S            2      .66     .66     .00
                             QLIMROIR   COMPOSITE PIECE - INDEX             *RSF S            1      .66     .33     .00
                             QLIMROIR   OIR SPACE                           *RSF S            1      .66     .33     .00
                             QMHSNDPM   MESSAGE FILE                        *RSF S            2      .66     .66     .00
                             QSPDSPFX   PROGRAM                             *RSF S            1      .66     .33     .00
                             QSPDSPFX   *UNKNOWN************************** *RSF S            1      .66     .33     .00
                             QUICBINT   PROGRAM                             *RSF S            1      .66     .33     .00
                             QUICBINT   *UNKNOWN************************** *RSF S            1      .66     .33     .00
                             QUIOPEN    PROGRAM                             *RSF S            2      .66     .66     .00
                             QCLCLCPR   LIBRARY                             *RSF S            1      .33     .33     .00
                             QMHRTMSS   MESSAGE FILE                        *RSF S            1      .33     .33     .00
                             QSPHNMLT   PROGRAM                             *RSF S            1      .33     .33     .00
                             QSYACCIP   LIBRARY                             *RSF S            1      .33     .33     .00
                             QUILIST    PROGRAM                             *RSF S            1      .33     .33     .00
                             QWPPUT     HOLD RECORD SEG                     *RSF S            1      .33     .33     .00
                                                                             TOTAL           301
PEXSBSD    QSYS       053539 QWTMMRLJ   PROGRAM                             *RSF S            6    56.25   37.50     .01
                             QWTMMRLJ   MWS AREA DATA SID                   *RSF S            2    56.25   12.50     .00
                             QWTMMRLJ   *UNKNOWN************************** *RSF S            1    56.25    6.25     .00
                             QWTMESBC   PROGRAM                             *RS  S            6    43.75   37.50     .01
                             QWTMESBC   *UNKNOWN************************** *RSF S            1    43.75    6.25     .00
                                                                             TOTAL            16
SCPF       QSYS       000000 QDBFEOD    DB IN USE TABLE                     *WS  S            2    38.46   15.38     .00
                             QDBFEOD    COMPOSITE PIECE - DATA SPACE        *WS  S            1    38.46    7.69     .00

08/02/96  18:59:40                      IO by Object Type within Program within Job                      PAGE   17
Process    Job        Job    Program    Object                              PDIO          PDIO  PCT          PCT     PCT
job name   user       number            Description                         Oper          Count PGM IO       Job     ALL
                                                                                                of JOB IO    IO      IO
SCPF       QSYS       000000 QDBFEOD    COMPOSITE PIECE - DATA SPACE        *WSP A            1    38.46    7.69     .00
                             QDBFEOD    COMPOSITE PIECE - DATA SPACE        *WSP S            1    38.46    7.69     .00
                             QMHRTMSS   MESSAGE FILE                        *RSF S            2    15.38   15.38     .00
                             QDBOPEN    *UNKNOWN************************** *RS  S            1     7.69    7.69     .00
                             QDMCLOSE   COMPOSITE PIECE - DATA SPACE        *WS  S            1     7.69    7.69     .00
                             QDMCOPEN   LIBRARY                             *RSF S            1     7.69    7.69     .00
                             QLIMROIR   OIR SPACE                           *WSP A            1     7.69    7.69     .00
                             QMHLOGER   FILE                                *WS  A            1     7.69    7.69     .00
                             TOPOFSTACK MWS AREA DATA SID                   *RSF S            1     7.69    7.69     .00
                                                                             TOTAL            13
                             TOPOFSTACK MWS AREA DATA SID                   *RSF S           12   100.00   92.31     .01
                             TOPOFSTACK HEAP DATA SEGMENT TYPE              *RSF S            1   100.00    7.69     .00
                                                                             TOTAL            13
QTGTELNETS QTCP       053298 TOPOFSTACK PROGRAM                             *RSF S            4    66.67   44.44     .00
                             TOPOFSTACK *UNKNOWN************************** *RSF S            2    66.67   22.22     .00
                             QTGTNTOC   PROGRAM                             *RSF S            2    22.22   22.22     .00
                             QTOASND    HEAP DATA SEGMENT TYPE              *RSF S            1    11.11   11.11     .00
                                                                             TOTAL             9
                             TOPOFSTACK MWS AREA DATA SID                   *RSF S            3   100.00   75.00     .00
                             TOPOFSTACK TEMPORARY - PROCESS CTL SPACE       *RS  S            1   100.00   25.00     .00
                                                                             TOTAL             4
QSERVER    QSYS       053254 TOPOFSTACK TEMPORARY - PROCESS CTL SPACE       *WS  S            2    66.67   66.67     .00
                             QWTMEPJP   TEMPORARY - INDEX                   *RSF S            1    33.33   33.33     .00
                                                                             TOTAL             3
                             TOPOFSTACK *UNKNOWN************************** *RSF S            2   100.00  100.00     .00
                             TOPOFSTACK MWS AREA DATA SID                   *RSF S            1   100.00  100.00     .00


08/02/96  18:59:40                      IO by Object Type within Program within Job                      PAGE   18
Process    Job        Job    Program    Object                              PDIO          PDIO  PCT          PCT     PCT
job name   user       number            Description                         Oper          Count PGM IO       Job     ALL
                                                                                                of JOB IO    IO      IO
                                                                             TOTAL             3
                                                                             FINAL TOTALS
                                                                             TOTAL        94,651
* * *  E N D  O F  R E P O R T  * * *
```

Figure 100 (Part 9 of 9). I/O by Object Type within Program within Job

10.2.23 Report Title - I/O by Object Type within Program

This report is produced from Command Option - By **PGM/Objtype.

```
                IO bu Object Type within Program
        QUERY NAME . . . . . PIOOBJ07
        LIBRARY NAME . . . . SMTRACE
        FILE         LIBRARY      MEMBER       FORMAT
        PIOOBJ06     PFREXP2      PEXTRACE     PIOOBJ06
        PIOOBJ05     PFREXP2      PEXTRACE     PIOOBJ05
        DATE . . . . . 08/02/96
        TIME . . . . . 19:00:31
                Pgm IO by Object Type - Part 12


08/02/96  19:00:31                  IO by Object Type within Program                  PAGE    1
Program     Object                              PDIO            PDIO      PCT      PCT   PCT
            Description                         Type            Total     PGM      ALL   PGM IO
                                                                          IO       IO    of ALL IO
TOPOFSTACK  TEMPORARY - PROCESS CTL SPACE       *WSP S          6,199   23.31     6.55      28.09
            HEAP DATA SEGMENT TYPE              *WSP S          3,692   13.88     3.90      28.09
            DATA SPACE RUN TIME SID             *WSP S          3,442   12.94     3.64      28.09
            *UNKNOWN*************************  *WSP S          3,388   12.74     3.58      28.09
            COMPOSITE PIECE - DATA SPACE        *WSP S          3,076   11.57     3.25      28.09
            HOLD RECORD SEG                     *WSP S          1,191    4.48     1.26      28.09
            TEMPORARY - SPACE                   *WSP S          1,027    3.86     1.09      28.09
            PROGRAM                             *WSP S            951    3.58     1.00      28.09
            TOMBSTONE SEGMENT                   *WSP S            886    3.33      .94      28.09
            SERVICE PROGRAM                     *WSP S            831    3.13      .88      28.09
            JOB MESSAGE QUEUE                   *WSP S            627    2.36      .66      28.09
            MODUL2 STATIC STORE                 *WSP S            302    1.14      .32      28.09
            HEAP CONTROL SEGMENT                *WSP S            281    1.06      .30      28.09
            MWS AREA DATA SID                   *WSP S            113     .42      .12      28.09
            TEMPORARY - PROCESS CTL SPACE       *RSF S             95     .36      .10      28.09
            WORK CONTROL BLOCK TABLE            *RSF S             89     .33      .09      28.09
            PROTECTED SPACE                     *WSP S             48     .18      .05      28.09
            PROGRAM                             *RSF S             43     .16      .05      28.09
            COMPOSITE PIECE - DATA SPACE INDEX  *WSP S             41     .15      .04      28.09
            CCSID INFORMATION OBJECT            *WSP S             31     .12      .03      28.09
            DATA SPACE INDEX RUN TIME           *WSP S             27     .10      .03      28.09
            SERVICE PROGRAM                     *RSF S             23     .09      .02      28.09
            MWS AREA DATA SID                   *RSF S             22     .08      .02      28.09
            MUTEX TEMP SEGMENT                  *WSP S             21     .08      .02      28.09
            HEAP DATA SEGMENT TYPE              *RSF S             20     .08      .02      28.09
            MWS AREA CTL SID                    *WSP S             17     .06      .02      28.09
            TEMPORARY - PROCESS CTL SPACE       *RS  S             16     .06      .02      28.09
            TOMBSTONE SEGMENT                   *RSF S             15     .06      .02      28.09
            TEMPORARY - INDEX                   *WSP S             12     .05      .01      28.09
            ACCESS GROUP                        *WSP S             12     .05      .01      28.09
            PROGRAM                             *RS  S             10     .04      .01      28.09
            *UNKNOWN*************************  *RSF S              9     .03      .01      28.09
            TEMPORARY - QUEUE                   *WSP S              7     .03      .01      28.09
            LIBRARY                             *WSP S              7     .03      .01      28.09
            TEMPORARY - SPACE                   *RSF S              7     .03      .01      28.09
            MESSAGE FILE                        *WSP S              6     .02      .01      28.09
```

Figure 101 (Part 1 of 12). I/O by Object Type within Program

```
08/02/96  19:00:31                  IO by Object Type within Program                  PAGE    2
Program     Object                              PDIO            PDIO      PCT      PCT   PCT
            Description                         Type            Total     PGM      ALL   PGM IO
                                                                          IO       IO    of ALL IO
TOPOFSTACK  TEMPORARY - PROCESS CTL SPACE       *WS  S              2     .01      .00      28.09
            JOB MESSAGE QUEUE                   *RSF S              2     .01      .00      28.09
            HOLD RECORD SEG                     *RSF S              2     .01      .00      28.09
            TEMPORARY - ACCESS GROUP            *RSF S              1     .00      .00      28.09
            SUBSYSTEM DESCRIPTION               *RSF S              1     .00      .00      28.09
                                                  TOTAL        26,592
TESTIO      COMPOSITE PIECE - DATA SPACE        *RX  A         11,969   65.33    12.65      19.36
            COMPOSITE PIECE - DATA SPACE        *RSF S          1,455    7.94     1.54      19.36
            PROGRAM                             *RSF S          1,446    7.89     1.53      19.36
            COMPOSITE PIECE - DATA SPACE        *RS  A          1,370    7.48     1.45      19.36
            *UNKNOWN**************************  *RS  S            745    4.07      .79      19.36
            COMPOSITE PIECE - DATA SPACE        *RS  S            473    2.58      .50      19.36
            FILE                                *RSF S            385    2.10      .41      19.36
            DATA SPACE RUN TIME SID             *RSF S            354    1.93      .37      19.36
            *UNKNOWN**************************  *RSF S             99     .54      .10      19.36
            HOLD RECORD SEG                     *RSF S             25     .14      .03      19.36
            WORK CONTROL BLOCK TABLE            *RSF S              1     .01      .00      19.36
                                                  TOTAL        18,322
ILEAGNEW    HEAP DATA SEGMENT TYPE              *RSF S          4,353   23.97     4.60      19.19
            TEMPORARY - PROCESS CTL SPACE       *RSF S          3,636   20.02     3.84      19.19
            PROGRAM                             *RSF S          2,597   14.30     2.74      19.19
            *UNKNOWN**************************  *RSF S          2,064   11.37     2.18      19.19
            SERVICE PROGRAM                     *RSF S          2,000   11.01     2.11      19.19
            PROGRAM                             *RS  S          1,101    6.06     1.16      19.19
            MODUL2 STATIC STORE                 *RSF S            730    4.02      .77      19.19
            TEMPORARY - SPACE                   *RSF S            561    3.09      .59      19.19
            HEAP CONTROL SEGMENT                *RSF S            280    1.54      .30      19.19
            JOB MESSAGE QUEUE                   *RSF S            274    1.51      .29      19.19
            HOLD RECORD SEG                     *RSF S            272    1.50      .29      19.19
            LIBRARY                             *RSF S            152     .84      .16      19.19
            TOMBSTONE SEGMENT                   *RSF S            113     .62      .12      19.19
            TEMPORARY - PROCESS CTL SPACE       *RS  S             16     .09      .02      19.19


08/02/96  19:00:31                  IO by Object Type within Program                  PAGE    3
Program     Object                              PDIO            PDIO      PCT      PCT   PCT
            Description                         Type            Total     PGM      ALL   PGM IO
                                                                          IO       IO    of ALL IO
ILEAGNEW    PROTECTED SPACE                     *RSF S              7     .04      .01      19.19
            LOCAL DATA AREA                     *RSF S              3     .02      .00      19.19
            JOB MESSAGE QUEUE                   *WS  S              1     .01      .00      19.19
            *UNKNOWN**************************  *WS  S              1     .01      .00      19.19
                                                  TOTAL        18,161
OPEN5       COMPOSITE PIECE - DATA SPACE        *RSF S          2,540   15.11     2.68      17.76
            DATA SPACE RUN TIME SID             *RSF S          2,389   14.21     2.52      17.76
            *UNKNOWN**************************  *RS  S          1,856   11.04     1.96      17.76
            PROGRAM                             *RSF S          1,815   10.80     1.92      17.76
            *UNKNOWN**************************  *RSF S          1,790   10.65     1.89      17.76
            COMPOSITE PIECE - DATA SPACE        *RS  A          1,595    9.49     1.69      17.76
            COMPOSITE PIECE - DATA SPACE        *RS  S          1,587    9.44     1.68      17.76
            FILE                                *RSF S          1,531    9.11     1.62      17.76
            TEMPORARY - PROCESS CTL SPACE       *RSF S            963    5.73     1.02      17.76
            HOLD RECORD SEG                     *RSF S            728    4.33      .77      17.76
            TEMPORARY - PROCESS CTL SPACE       *RS  S             13     .08      .01      17.76
            WORK CONTROL BLOCK TABLE            *RSF S              5     .03      .01      17.76
                                                  TOTAL        16,812
TESTIOC     PROGRAM                             *RSF S          1,792   45.53     1.89       4.16
            LIBRARY                             *RSF S          1,246   31.66     1.32       4.16
            USER PROFILE                        *RSF S            404   10.26      .43       4.16
            TEMPORARY - SPACE                   *RSF S            371    9.43      .39       4.16
            SERVICE PROGRAM                     *RSF S            112    2.85      .12       4.16
            PROTECTED SPACE                     *RSF S              8     .20      .01       4.16
            LOCAL DATA AREA                     *RSF S              3     .08      .00       4.16
                                                  TOTAL         3,936
QCMDEXC     SERVICE PROGRAM                     *RSF S          1,215   33.79     1.28       3.80
            HEAP DATA SEGMENT TYPE              *RSF S            662   18.41      .70       3.80
            TEMPORARY - PROCESS CTL SPACE       *RSF S            462   12.85      .49       3.80
            *UNKNOWN**************************  *RSF S            351    9.76      .37       3.80
```

Figure 101 (Part 2 of 12). I/O by Object Type within Program

```
08/02/96  19:00:31                  IO by Object Type within Program                PAGE    4
Program     Object                              PDIO            PDIO      PCT      PCT   PCT
            Description                         Type            Total     PGM      ALL   PGM IO
                                                                          IO       IO    of ALL IO
QCMDEXC     PROGRAM                             *RSF S            232    6.45      .25       3.80
            ACTIVATION PROC REF TBL             *RSF S            168    4.67      .18       3.80
            MWS AREA DATA SID                   *RSF S            143    3.98      .15       3.80
            TOMBSTONE SEGMENT                   *RSF S             72    2.00      .08       3.80
            TEMPORARY - INDEX                   *RSF S             60    1.67      .06       3.80
            PROGRAM                             *RS  S             42    1.17      .04       3.80
            TEMPORARY - PROCESS CTL SPACE       *RS  S             41    1.14      .04       3.80
            MUTEX TEMP SEGMENT                  *RSF S             32     .89      .03       3.80
            JOB MESSAGE QUEUE                   *RSF S             25     .70      .03       3.80
            LIBRARY                             *RSF S             18     .50      .02       3.80
            USER PROFILE                        *RSF S             15     .42      .02       3.80
            MWS AREA CTL SID                    *RSF S             14     .39      .01       3.80
            MODUL2 STATIC STORE                 *RSF S             14     .39      .01       3.80
            CCSID INFORMATION OBJECT            *RSF S             12     .33      .01       3.80
            ACCESS GROUP                        *RSF S             12     .33      .01       3.80
            TEMPORARY - QUEUE                   *RSF S              6     .17      .01       3.80
                                                  TOTAL         3,596
OPENBAD     PROGRAM                             *RSF S          1,508   56.00     1.59       2.85
            TEMPORARY - SPACE                   *RSF S            623   23.13      .66       2.85
            LIBRARY                             *RSF S            257    9.54      .27       2.85
            TEMPORARY - PROCESS CTL SPACE       *RSF S            224    8.32      .24       2.85
            PROTECTED SPACE                     *RSF S             27    1.00      .03       2.85
            SERVICE PROGRAM                     *RSF S             24     .89      .03       2.85
            TOMBSTONE SEGMENT                   *RSF S             15     .56      .02       2.85
            LOCAL DATA AREA                     *RSF S              8     .30      .01       2.85
            TEMPORARY - PROCESS CTL SPACE       *RS  S              6     .22      .01       2.85
            *UNKNOWN**************************** *RSF S              1     .04      .00       2.85
                                                  TOTAL         2,693
ILEAGN      TOMBSTONE SEGMENT                   *RSF S            510   35.71      .54       1.51
            TEMPORARY - PROCESS CTL SPACE       *RSF S            454   31.79      .48       1.51
            PROGRAM                             *RSF S            280   19.61      .30       1.51
            HEAP DATA SEGMENT TYPE              *RSF S            184   12.89      .19       1.51
```

Figure 101 (Part 3 of 12). I/O by Object Type within Program

```
08/02/96  19:00:31                  IO by Object Type within Program                PAGE    5
Program     Object                              PDIO            PDIO      PCT      PCT   PCT
            Description                         Type            Total     PGM      ALL   PGM IO
                                                                          IO       IO    of ALL IO
                                                  TOTAL         1,428
QWTCCRLJ    WORK CONTROL BLOCK TABLE            *RX  A          1,062   97.97     1.12       1.15
            WORK CONTROL BLOCK TABLE            *RSF S              7     .65      .01       1.15
            SPOOL CTL BLOCK                     *RSF S              3     .28      .00       1.15
            WORK CONTROL BLOCK TABLE            *RS  A              3     .28      .00       1.15
            WORK CONTROL BLOCK TABLE            *RS  S              3     .28      .00       1.15
            PROGRAM                             *RSF S              2     .18      .00       1.15
            MWS AREA DATA SID                   *RSF S              2     .18      .00       1.15
            PROGRAM                             *RS  S              1     .09      .00       1.15
            *UNKNOWN**************************** *RSF S              1     .09      .00       1.15
                                                  TOTAL         1,084
QDMCOPEN    HEAP DATA SEGMENT TYPE              *RSF S            102   31.48      .11        .34
            SERVICE PROGRAM                     *RSF S             86   26.54      .09        .34
            TEMPORARY - PROCESS CTL SPACE       *RSF S             35   10.80      .04        .34
            LIBRARY                             *RSF S             32    9.88      .03        .34
            USER PROFILE                        *RSF S             28    8.64      .03        .34
            MODUL2 STATIC STORE                 *RSF S             19    5.86      .02        .34
            FILE                                *RSF S             17    5.25      .02        .34
            PROGRAM                             *RSF S              2     .62      .00        .34
            WORK CONTROL BLOCK TABLE            *RSF S              2     .62      .00        .34
            *UNKNOWN**************************** *RSF S              1     .31      .00        .34
                                                  TOTAL           324
QDBOPEN     CCSID INFORMATION OBJECT            *RSF S             74   27.31      .08        .29
            PROGRAM                             *RSF S             52   19.19      .05        .29
            HOLD RECORD SEG                     *RSF S             38   14.02      .04        .29
            TEMPORARY - PROCESS CTL SPACE       *RSF S             34   12.55      .04        .29
            COMPOSITE PIECE - DATA SPACE        *RSF S             17    6.27      .02        .29
            DATA SPACE RUN TIME SID             *RSF S             17    6.27      .02        .29
            COMPOSITE PIECE - DATA SPACE INDEX  *RSF S             16    5.90      .02        .29
            FILE FORMAT                         *RSF S             13    4.80      .01        .29
            *UNKNOWN**************************** *RSF S              6    2.21      .01        .29
```

Figure 101 (Part 4 of 12). I/O by Object Type within Program

```
08/02/96  19:00:31                  IO by Object Type within Program                  PAGE    6
Program     Object                              PDIO            PDIO      PCT      PCT   PCT
            Description                         Type            Total     PGM      ALL   PGM IO
                                                                          IO       IO    of ALL IO
QDBOPEN     TEMPORARY - PROCESS CTL SPACE       *RS  S              3    1.11      .00       .29
            *UNKNOWN*************************** *RS  S              1     .37      .00       .29
                                                  TOTAL            271
QDBGETKY    COMPOSITE PIECE - DATA SPACE INDEX  *RSF S             39   21.20      .04       .19
            COMPOSITE PIECE - DATA SPACE        *RS  S             29   15.76      .03       .19
            *UNKNOWN*************************** *RSF S             28   15.22      .03       .19
            DATA SPACE INDEX RUN TIME           *RSF S             25   13.59      .03       .19
            COMPOSITE PIECE - DATA SPACE        *RSF S             23   12.50      .02       .19
            TEMPORARY - PROCESS CTL SPACE       *RSF S             16    8.70      .02       .19
            COMPOSITE PIECE - DATA SPACE        *RS  A             12    6.52      .01       .19
            DATA SPACE RUN TIME SID             *RSF S             12    6.52      .01       .19
                                                  TOTAL            184
QMHSNDPM    MESSAGE FILE                        *RSF S             60   37.50      .06       .17
            JOB MESSAGE QUEUE                   *RSF S             56   35.00      .06       .17
            LIBRARY                             *RSF S             18   11.25      .02       .17
            PROGRAM                             *RSF S              8    5.00      .01       .17
            MODUL2 STATIC STORE                 *RSF S              6    3.75      .01       .17
            HEAP DATA SEGMENT TYPE              *RSF S              5    3.13      .01       .17
            TEMPORARY - PROCESS CTL SPACE       *RSF S              4    2.50      .00       .17
            TEMPORARY - PROCESS CTL SPACE       *RS  S              1     .63      .00       .17
            TOMBSTONE SEGMENT                   *RSF S              1     .63      .00       .17
            *UNKNOWN*************************** *RSF S              1     .63      .00       .17
                                                  TOTAL            160
QWCDLYJB    TEMPORARY - PROCESS CTL SPACE       *WSP S             31   43.06      .03       .08
            ACCESS GROUP                        *RSF S             14   19.44      .01       .08
            PROGRAM                             *RSF S             13   18.06      .01       .08
            TEMPORARY - PROCESS CTL SPACE       *WS  S             12   16.67      .01       .08
            DATA BASE OPERATIONAL CURSOR        *WSP S              1    1.39      .00       .08
            TEMPORARY - PROCESS CTL SPACE       *RS  S              1    1.39      .00       .08
```

Figure 101 (Part 5 of 12). I/O by Object Type within Program

```
08/02/96  19:00:31                  IO by Object Type within Program                  PAGE    7
Program     Object                              PDIO            PDIO      PCT      PCT   PCT
            Description                         Type            Total     PGM      ALL   PGM IO
                                                                          IO       IO    of ALL IO
                                                  TOTAL             72
QCLCLCPR    PROGRAM                             *RSF S             42   60.87      .04       .07
            LIBRARY                             *RSF S             15   21.74      .02       .07
            TEMPORARY - SPACE                   *RSF S              8   11.59      .01       .07
            MODUL2 STATIC STORE                 *RSF S              2    2.90      .00       .07
            TEMPORARY - PROCESS CTL SPACE       *RS  S              1    1.45      .00       .07
            *UNKNOWN*************************** *RSF S              1    1.45      .00       .07
                                                  TOTAL             69
QMHRSNEM    PROGRAM                             *RSF S             31   50.82      .03       .06
            MODUL2 STATIC STORE                 *RSF S              9   14.75      .01       .06
            TEMPORARY - PROCESS CTL SPACE       *RSF S              6    9.84      .01       .06
            JOB MESSAGE QUEUE                   *RSF S              6    9.84      .01       .06
            HEAP DATA SEGMENT TYPE              *RSF S              6    9.84      .01       .06
            TOMBSTONE SEGMENT                   *RSF S              3    4.92      .00       .06
                                                  TOTAL             61
QLIDLOBJ    JOB MESSAGE QUEUE                   *RSF S             17   32.08      .02       .06
            TOMBSTONE SEGMENT                   *RSF S             12   22.64      .01       .06
            PROGRAM                             *RSF S              6   11.32      .01       .06
            TEMPORARY - PROCESS CTL SPACE       *RSF S              6   11.32      .01       .06
            MODUL2 STATIC STORE                 *RSF S              6   11.32      .01       .06
            HEAP DATA SEGMENT TYPE              *RSF S              6   11.32      .01       .06
                                                  TOTAL             53
QSPRCMBR    COMPOSITE PIECE - DATA SPACE        *WS  S             25   52.08      .03       .05
            SPOOL CTL BLOCK                     *WSP S              7   14.58      .01       .05
            DB IN USE TABLE                     *WS  S              6   12.50      .01       .05
            COMPOSITE PIECE - DATA SPACE        *WSP S              5   10.42      .01       .05
            *UNKNOWN*************************** *RSF S              2    4.17      .00       .05
            COMPOSITE PIECE - DATA SPACE        *RSF S              1    2.08      .00       .05
            FILE AVAIL CTL BLOCK                *RSF S              1    2.08      .00       .05
```

Figure 101 (Part 6 of 12). I/O by Object Type within Program

```
08/02/96  19:00:31                  IO by Object Type within Program                PAGE    8
Program     Object                              PDIO            PDIO      PCT      PCT   PCT
            Description                         Type            Total     PGM      ALL   PGM IO
                                                                          IO       IO    of ALL IO
QSPRCMBR    PROGRAM                             *RSF S              1    2.08      .00       .05
                                                  TOTAL            48
QCATRS      PROGRAM                             *RSF S             28   63.64      .03       .05
            LIBRARY                             *RSF S             14   31.82      .01       .05
            COMMAND                             *WS  A              1    2.27      .00       .05
            *UNKNOWN**************************  *RSF S              1    2.27      .00       .05
                                                  TOTAL            44
QDMCLOSE    COMPOSITE PIECE - DATA SPACE        *RSF S             12   27.91      .01       .05
            COMPOSITE PIECE - DATA SPACE INDEX  *RSF S             12   27.91      .01       .05
            DATA SPACE RUN TIME SID             *RSF S             12   27.91      .01       .05
            COMPOSITE PIECE - DATA SPACE        *WS  S              4    9.30      .00       .05
            COMPOSITE PIECE - DATA SPACE        *WS  A              1    2.33      .00       .05
            PROGRAM                             *RS  S              1    2.33      .00       .05
            *UNKNOWN**************************  *RSF S              1    2.33      .00       .05
                                                  TOTAL            43
QSPOPEN     PRINT QUEUE                         *RSF S             12   28.57      .01       .04
            SPOOL CTL BLOCK                     *WSP S             10   23.81      .01       .04
            OUTPUT QUEUE                        *WS  S              5   11.90      .01       .04
            *UNKNOWN**************************  *RSF S              4    9.52      .00       .04
            HOLD RECORD SEG                     *RSF S              3    7.14      .00       .04
            OUTPUT QUEUE                        *RSF S              2    4.76      .00       .04
            PROGRAM                             *RS  S              2    4.76      .00       .04
            USER PROFILE                        *RSF S              1    2.38      .00       .04
            SPOOL CTL BLOCK                     *WS  S              1    2.38      .00       .04
            CHANGED PAGE BITMAP                 *RSF S              1    2.38      .00       .04
            *UNKNOWN**************************  *WS  S              1    2.38      .00       .04
                                                  TOTAL            42
QMHMOVPM    JOB MESSAGE QUEUE                   *RSF S             25   69.44      .03       .04
```

Figure 101 (Part 7 of 12). I/O by Object Type within Program

```
08/02/96  19:00:31                  IO by Object Type within Program                PAGE    9
Program     Object                              PDIO            PDIO      PCT      PCT   PCT
            Description                         Type            Total     PGM      ALL   PGM IO
                                                                          IO       IO    of ALL IO
QMHMOVPM    TOMBSTONE SEGMENT                   *RSF S              7   19.44      .01       .04
            TEMPORARY - PROCESS CTL SPACE       *RSF S              4   11.11      .00       .04
                                                  TOTAL            36
QSQENDAG    TEMPORARY - PROCESS CTL SPACE       *RSF S             20   55.56      .02       .04
            MODUL2 STATIC STORE                 *RSF S              6   16.67      .01       .04
            HEAP DATA SEGMENT TYPE              *RSF S              6   16.67      .01       .04
            PROGRAM                             *RSF S              2    5.56      .00       .04
            JOB MESSAGE QUEUE                   *RSF S              2    5.56      .00       .04
                                                  TOTAL            36
QCANPARS    CCSID INFORMATION OBJECT            *RSF S             28   80.00      .03       .04
            HOLD RECORD SEG                     *RSF S              7   20.00      .01       .04
                                                  TOTAL            35
QSPCLOSE    COMPOSITE PIECE - DATA SPACE        *WSP A             10   29.41      .01       .04
            SPOOL CTL BLOCK                     *WSP S              6   17.65      .01       .04
            DB IN USE TABLE                     *WS  S              6   17.65      .01       .04
            COMPOSITE PIECE - DATA SPACE        *WS  S              5   14.71      .01       .04
            OUTPUT QUEUE                        *WS  S              5   14.71      .01       .04
            COMPOSITE PIECE - DATA SPACE        *RSF S              1    2.94      .00       .04
            PROGRAM                             *RSF S              1    2.94      .00       .04
                                                  TOTAL            34
QDBCRTME    LIBRARY                             *WS  S              6   18.75      .01       .03
            COMPOSITE PIECE - DATA SPACE        *WS  A              4   12.50      .00       .03
            USER PROFILE                        *WS  S              4   12.50      .00       .03
            *UNKNOWN**************************  *RSF S              4   12.50      .00       .03
            USER PROFILE                        *RSF S              3    9.38      .00       .03
            DATA BASE FILE MEMBER               *WS  A              2    6.25      .00       .03
                                                *RSF S              2    6.25      .00       .03
            *UNKNOWN**************************  *WS  A              2    6.25      .00       .03
```

Figure 101 (Part 8 of 12). I/O by Object Type within Program

```
08/02/96  19:00:31                  IO by Object Type within Program                  PAGE   10
Program     Object                              PDIO            PDIO      PCT      PCT   PCT
            Description                         Type            Total     PGM      ALL   PGM IO
                                                                          IO       IO    of ALL IO
QDBCRTME    *UNKNOWN**************************  *WS  S             2     6.25      .00       .03
            DATA BASE FILE MEMBER               *WS  S             1     3.13      .00       .03
            FILE                                *WS  A             1     3.13      .00       .03
            DATA SPACE RUN TIME SID             *RSF S             1     3.13      .00       .03
                                                  TOTAL           32
QLICHLLE    PROGRAM                             *RSF S            13    40.63      .01       .03
            HOLD RECORD SEG                     *RSF S            12    37.50      .01       .03
            LIBRARY                             *RSF S             7    21.88      .01       .03
                                                  TOTAL           32
QCADRV2     PROGRAM                             *RS  S            26    89.66      .03       .03
            TEMPORARY - PROCESS CTL SPACE       *RSF S             2     6.90      .00       .03
            HOLD RECORD SEG                     *RSF S             1     3.45      .00       .03
                                                  TOTAL           29
QMHPDEH     JOB MESSAGE QUEUE                   *RSF S            15    55.56      .02       .03
            TEMPORARY - PROCESS CTL SPACE       *RSF S            12    44.44      .01       .03
                                                  TOTAL           27
QCARULE     LIBRARY                             *RSF S            13    50.00      .01       .03
            PROTECTED SPACE                     *RSF S             9    34.62      .01       .03
            COMMAND                             *RSF S             3    11.54      .00       .03
            *UNKNOWN**************************  *RSF S             1     3.85      .00       .03
                                                  TOTAL           26
QCACHLBL    PROGRAM                             *RS  S            12    48.00      .01       .03
            PROGRAM                             *RSF S             6    24.00      .01       .03
            *UNKNOWN**************************  *RSF S             6    24.00      .01       .03
            HOLD RECORD SEG                     *RSF S             1     4.00      .00       .03
                                                  M05


08/02/96  19:00:31                  IO by Object Type within Program                  PAGE   11
Program     Object                              PDIO            PDIO      PCT      PCT   PCT
            Description                         Type            Total     PGM      ALL   PGM IO
                                                                          IO       IO    of ALL IO
                                                  TOTAL           25
QCAIEXIT    *UNKNOWN**************************  *RSF S            12    48.00      .01       .03
            PROGRAM                             *RSF S             6    24.00      .01       .03
            USER PROFILE                        *RSF S             6    24.00      .01       .03
            HOLD RECORD SEG                     *RSF S             1     4.00      .00       .03
                                                  TOTAL           25
QUIMGFLW    TEMPORARY - SPACE                   *RS  S            11    44.00      .01       .03
            PANEL GROUP DEFINITION              *RSF S             8    32.00      .01       .03
            PROGRAM                             *RS  S             2     8.00      .00       .03
            PROGRAM                             *RSF S             2     8.00      .00       .03
            TEMPORARY - SPACE                   *RSF S             1     4.00      .00       .03
            *UNKNOWN**************************  *RSF S             1     4.00      .00       .03
                                                  TOTAL           25
QUSRJOBI    TEMPORARY - PROCESS CTL SPACE       *RSF S            16    72.73      .02       .02
            SPOOL CTL BLOCK                     *RSF S             6    27.27      .01       .02
                                                  TOTAL           22
QWCCDSTC    *UNKNOWN**************************  *RSF S            13    59.09      .01       .02
            MWS AREA DATA SID                   *RSF S             5    22.73      .01       .02
            PROGRAM                             *RS  S             4    18.18      .00       .02
                                                  TOTAL           22
QDBFEOD     COMPOSITE PIECE - DATA SPACE        *WS  S             7    36.84      .01       .02
            DB IN USE TABLE                     *WS  S             5    26.32      .01       .02
            COMPOSITE PIECE - DATA SPACE        *WSP S             4    21.05      .00       .02
            COMPOSITE PIECE - DATA SPACE        *WSP A             2    10.53      .00       .02
            *UNKNOWN**************************  *WS  S             1     5.26      .00       .02
                                                  TOTAL           19
```

Figure 101 (Part 9 of 12). I/O by Object Type within Program

```
08/02/96  19:00:31                  IO by Object Type within Program                PAGE   12
Program     Object                              PDIO           PDIO      PCT      PCT   PCT
            Description                         Type           Total     PGM      ALL   PGM IO
                                                                         IO       IO    of ALL IO
QMHCHGEM    PROGRAM                             *RSF S             7    50.00     .01       .01
            TEMPORARY - PROCESS CTL SPACE       *RSF S             6    42.86     .01       .01
            MODUL2 STATIC STORE                 *RSF S             1     7.14     .00       .01
                                                  TOTAL           14
QMHSNSTQ    MESSAGE QUEUE                       *WS  A             6    42.86     .01       .01
            WORK CONTROL BLOCK TABLE            *RSF S             3    21.43     .00       .01
            MESSAGE QUEUE                       *WS  S             3    21.43     .00       .01
            PROGRAM                             *RSF S             1     7.14     .00       .01
            MESSAGE QUEUE                       *RSF S             1     7.14     .00       .01
                                                  TOTAL           14
QCADRV      PROGRAM                             *RS  S             8    61.54     .01       .01
            TEMPORARY - SPACE                   *RSF S             3    23.08     .00       .01
            PROTECTED SPACE                     *RSF S             2    15.38     .00       .01
                                                  TOTAL           13
QDBCLOSE    *UNKNOWN**************************  *RSF S            12    92.31     .01       .01
            HOLD RECORD SEG                     *RSF S             1     7.69     .00       .01
                                                  TOTAL           13
QUSDLTUS    TEMPORARY - PROCESS CTL SPACE       *RSF S             7    53.85     .01       .01
            PROGRAM                             *RSF S             6    46.15     .01       .01
                                                  TOTAL           13
QDCXLATE    TEMPORARY - PROCESS CTL SPACE       *RSF S             6    50.00     .01       .01
            TABLE                               *RSF S             6    50.00     .01       .01
                                                  TOTAL           12
QDMRCLSE    PROGRAM                             *RS  S             5    45.45     .01       .01
                                                  M05


08/02/96  19:00:31                  IO by Object Type within Program                PAGE   13
Program     Object                              PDIO           PDIO      PCT      PCT   PCT
            Description                         Type           Total     PGM      ALL   PGM IO
                                                                         IO       IO    of ALL IO
QDMRCLSE    PROGRAM                             *RSF S             5    45.45     .01       .01
            TEMPORARY - PROCESS CTL SPACE       *RSF S             1     9.09     .00       .01
                                                  TOTAL           11
QSPCNSPF    OUTPUT QUEUE                        *WS  S             5    50.00     .01       .01
            PROGRAM                             *RSF S             4    40.00     .00       .01
            *UNKNOWN**************************  *RSF S             1    10.00     .00       .01
                                                  TOTAL           10
QUIPRINT    TEMPORARY - SPACE                   *RS  S             7    70.00     .01       .01
            TEMPORARY - SPACE                   *RSF S             2    20.00     .00       .01
            PANEL GROUP DEFINITION              *RSF S             1    10.00     .00       .01
                                                  TOTAL           10
QMHRTMSS    TEMPORARY - PROCESS CTL SPACE       *RSF S             6    66.67     .01       .01
            MESSAGE FILE                        *RSF S             3    33.33     .00       .01
                                                  TOTAL            9
QWTMMRLJ    PROGRAM                             *RSF S             6    66.67     .01       .01
            MWS AREA DATA SID                   *RSF S             2    22.22     .00       .01
            *UNKNOWN**************************  *RSF S             1    11.11     .00       .01
                                                  TOTAL            9
QMHRCVPM    TEMPORARY - PROCESS CTL SPACE       *RSF S             8   100.00     .01       .01
                                                  TOTAL            8
QSPCPYF     PROGRAM                             *RSF S             4    50.00     .00       .01
            PROGRAM                             *RS  S             2    25.00     .00       .01
            LIBRARY                             *RSF S             1    12.50     .00       .01
            *UNKNOWN**************************  *RSF S             1    12.50     .00       .01
```

Figure 101 (Part 10 of 12). I/O by Object Type within Program

```
08/02/96  19:00:31                  IO by Object Type within Program                  PAGE   14
Program     Object                              PDIO            PDIO      PCT      PCT   PCT
            Description                         Type            Total     PGM      ALL   PGM IO
                                                                          IO       IO    of ALL IO
                                                  TOTAL             8
QTMPCKP     PROGRAM                             *RSF S            7   100.00      .01        .01
                                                  TOTAL             7
QWTMESBC    PROGRAM                             *RS  S            6    85.71      .01        .01
            *UNKNOWN*************************** *RSF S            1    14.29      .00        .01
                                                  TOTAL             7
QLICNV      TEMPORARY - PROCESS CTL SPACE       *RSF S            6   100.00      .01        .01
                                                  TOTAL             6
QTQGESP     TEMPORARY - PROCESS CTL SPACE       *RSF S            6   100.00      .01        .01
                                                  TOTAL             6
QUICMD      PROGRAM                             *RS  S            4    66.67      .00        .01
            PROGRAM                             *RSF S            1    16.67      .00        .01
            *UNKNOWN*************************** *RSF S            1    16.67      .00        .01
                                                  TOTAL             6
QWPALLOC    PROGRAM                             *RSF S            6   100.00      .01        .01
                                                  TOTAL             6
QSYGRTSA    USER PROFILE                        *RSF S            3    60.00      .00        .01
            COMPOSITE PIECE - DATA SPACE        *WSP S            1    20.00      .00        .01
            DATA BASE FILE MEMBER               *WSP S            1    20.00      .00        .01
                                                  TOTAL             5
QSPCHJOB    SPOOL CTL BLOCK                     *WS  S            3    75.00      .00        .00
                                                  MO5


08/02/96  19:00:31                  IO by Object Type within Program                  PAGE   15
Program     Object                              PDIO            PDIO      PCT      PCT   PCT
            Description                         Type            Total     PGM      ALL   PGM IO
                                                                          IO       IO    of ALL IO
QSPCHJOB    HOLD RECORD SEG                     *RSF S            1    25.00      .00        .00
                                                  TOTAL             4
QUIRCLAP    TEMPORARY - PROCESS CTL SPACE       *RSF S            4   100.00      .00        .00
                                                  TOTAL             4
QLIMROIR    COMPOSITE PIECE - INDEX             *RSF S            1    33.33      .00        .00
            OIR SPACE                           *RSF S            1    33.33      .00        .00
            OIR SPACE                           *WSP A            1    33.33      .00        .00
                                                  TOTAL             3
QUICLOSE    PROGRAM                             *RSF S            2    66.67      .00        .00
            *UNKNOWN*************************** *RSF S            1    33.33      .00        .00
                                                  TOTAL             3
QUIICHK     PANEL GROUP DEFINITION              *RSF S            2    66.67      .00        .00
            PROGRAM                             *RSF S            1    33.33      .00        .00
                                                  TOTAL             3
QCAIFLD     TEMPORARY - PROCESS CTL SPACE       *RSF S            2   100.00      .00        .00
                                                  TOTAL             2
QEZWRAST    PROGRAM                             *RSF S            1    50.00      .00        .00
            *UNKNOWN*************************** *RSF S            1    50.00      .00        .00
                                                  TOTAL             2
QSPDSPFX    PROGRAM                             *RSF S            1    50.00      .00        .00
            *UNKNOWN*************************** *RSF S            1    50.00      .00        .00
```

Figure 101 (Part 11 of 12). I/O by Object Type within Program

```
08/02/96  19:00:31                  IO by Object Type within Program                 PAGE   16
Program     Object                              PDIO            PDIO      PCT      PCT   PCT
            Description                         Type            Total     PGM      ALL   PGM IO
                                                                          IO       IO    of ALL IO
                                                  TOTAL             2
QTGTNTOC    PROGRAM                             *RSF S            2  100.00      .00       .00
                                                  TOTAL             2
QUICBINT    PROGRAM                             *RSF S            1   50.00      .00       .00
            *UNKNOWN**************************** *RSF S            1   50.00      .00       .00
                                                  TOTAL             2
QUIEXFMT    PANEL GROUP DEFINITION              *RSF S            2  100.00      .00       .00
                                                  TOTAL             2
QUIINMGR    TEMPORARY - SPACE                   *RSF S            2  100.00      .00       .00
                                                  TOTAL             2
QUILIST     PROGRAM                             *RSF S            1   50.00      .00       .00
            TEMPORARY - SPACE                   *RSF S            1   50.00      .00       .00
                                                  TOTAL             2
QUIOPEN     PROGRAM                             *RSF S            2  100.00      .00       .00
                                                  TOTAL             2
QMHLOGER    FILE                                *WS  A            1  100.00      .00       .00
                                                  TOTAL             1
QSPHNMLT    PROGRAM                             *RSF S            1  100.00      .00       .00
                                                  TOTAL             1
                                                  M05


08/02/96  19:00:31                  IO by Object Type within Program                 PAGE   17
Program     Object                              PDIO            PDIO      PCT      PCT   PCT
            Description                         Type            Total     PGM      ALL   PGM IO
                                                                          IO       IO    of ALL IO
QSYACCIP    LIBRARY                             *RSF S            1  100.00      .00       .00
                                                  TOTAL             1
QTOASND     HEAP DATA SEGMENT TYPE              *RSF S            1  100.00      .00       .00
                                                  TOTAL             1
QUIALIST    PROGRAM                             *RSF S            1  100.00      .00       .00
                                                  TOTAL             1
QUIVPMGR    PANEL GROUP DEFINITION              *RSF S            1  100.00      .00       .00
                                                  TOTAL             1
QWCSHUIC    PROGRAM                             *RSF S            1  100.00      .00       .00
                                                  TOTAL             1
QWPPUT      HOLD RECORD SEG                     *RSF S            1  100.00      .00       .00
                                                  TOTAL             1
QWTMEPJP    TEMPORARY - INDEX                   *RSF S            1  100.00      .00       .00
                                                  TOTAL             1
                                                  FINAL TOTALS
                                                  TOTAL        94,651
* * *  E N D  O F  R E P O R T  * * *
```

Figure 101 (Part 12 of 12). I/O by Object Type within Program

10.3 Activation Group Details (ACTGRP Command)

This section provides an example of every report you can produce using this command.

Please refer to Section 6.6.3, “ACTGRP Reporting Command” on page 153 for a details of how to use the ACTGRP command to produce these reports.

Refer to Table 13 on page 168 for details on the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

10.3.1 Report Title - Activation Group Creates by Job

```
                                        Activation Group Creates
                                        by
                                        Job
                                  QUERY NAME . . . . . ACTGRP03
                                  LIBRARY NAME . . . . SMTRACE
                                  FILE         LIBRARY      MEMBER       FORMAT
                                  ACTGRP02     PFREXP2      PEXTRACE     ACTGRP02
                                  ACTGRP02     PFREXP2      PEXTRACE     ACTGRP02
                                  DATE . . . . . 08/02/96
                                  TIME . . . . . 19:00:44
                                        Activation Group Creates - Part 2 (Job

08/02/96  19:00:44  Activation Group Creates by Job  PAGE    1
Job                              ACTGRP   Pct ALL   TDE
                                 Creates  ACTGRP
                                          Creates
ILEAGNEW  A960126A  053541            279    97.55   0000880E
JUNK      QSPLJOB   053464              7     2.45   00008408
                      FINAL TOTALS
                      TOTAL           286
* * *  E N D  O F  R E P O R T  * * *
```

Figure 102. Activation Group Creates by Job

10.3.2 Report Title - Activation Group Creates by Program within Job

```
                                        Activation Group Creates
                                        by
                                        Program within Job
                                  QUERY NAME . . . . . ACTGRP04
                                  LIBRARY NAME . . . . SMTRACE
                                  FILE         LIBRARY      MEMBER       FORMAT
                                  ACTGRP02     PFREXP2      PEXTRACE     ACTGRP02
                                  ACTGRP02     PFREXP2      PEXTRACE     ACTGRP02
                                  DATE . . . . . 08/02/96
                                  TIME . . . . . 19:00:45
                                      Activation Group Creates - Part 3 (Job/Pgm

08/02/96  19:00:45  Activation Group Creates by Program within Job   PAGE    1
Job                        Program Causing        ACTGRP   Pct ALL   TDE
                           ACTGRP Creation        Creates  ACTGRP
                                                           Creates
ILEAGNEW  A960126A  053541    ILEAGN                  279    97.55   0000880E
JUNK      QSPLJOB   053464    QTMPLPRC                  7     2.45   00008408
                                     FINAL TOTALS
                                     TOTAL           286
* * *  E N D  O F  R E P O R T  * * *
```

Figure 103. Activation Group Creates by Program within Job

10.3.3 Report Title - Activation Group Creates by Program

Note: Application program names appear in this report **irrespective** of the value specified for ″Trace MI CALL Events?″ on the PEX collection command SMTBCH.

```
                    Activation Group Creates
                    by
                    Program
          QUERY NAME . . . . . ACTGRP05
          LIBRARY NAME . . . . SMTRACE
          FILE         LIBRARY      MEMBER       FORMAT
          ACTGRP02A    PFREXP2      PEXTRACE     ACTGRP02A
          ACTGRP02A    PFREXP2      PEXTRACE     ACTGRP02A
          DATE . . . . . 08/02/96
          TIME . . . . . 19:00:45
                Activation Group Creates - Part 5 (Pgm


08/02/96  19:00:45  Activation Group Creates by Program  PAGE    1
Program Causing        ACTGRP   Pct ALL
ACTGRP Create          Creates  ACTGRP
                                Creates
  ILEAGN                   279    97.55
  QTMPLPRC                   7     2.45
           FINAL TOTALS
           TOTAL           286
* * *  E N D  O F  R E P O R T  * * *
```

Figure 104. Activation Group Creates by Program

10.4 Page Fault Information (FLTS Command)

This section provides an example of every report you can produce using this command.

Please refer to Section 6.6.4, “FLTS Reporting Command” on page 155 for a details of how to use the FLTS command to produce these reports.

Refer to Table 13 on page 168 for details of the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

10.4.1 Report Title - Page Faults by Object/Segment Name and Description

This report is produced from Command Option - By Object/Segment Name.

```
Page faults by object/segment name and description.
(only obj/segs that had 1% or more of all system faults)
   QUERY NAME . . . . . FLT3
   LIBRARY NAME . . . . SMTRACE
   FILE         LIBRARY      MEMBER       FORMAT
   FLT1         PFREXP2      PEXTRACE     FLT1
   FLT2         PFREXP2      PEXTRACE     FLT2
   DATE . . . . . 08/02/96
   TIME . . . . . 19:01:34
```

Number of faults	Percent of all system faults	Object/Segment name and obj type		Segment type	Object/Segment description	
4,543	11.30	FCFA2024DA00		0000	20D6	HEAP DATA SEGMENT TYPE
4,090	10.17	ILEAGNEW	A960126A	1AEF	0006	TEMPORARY - PROCESS CTL SPACE
2,385	5.93	OPEN5		0201	0001	PROGRAM
1,974	4.91	*DESTROYED		0000	0000	
1,929	4.80	TESTIO		0201	0001	PROGRAM
1,461	3.63	ILEAGN		0201	0001	PROGRAM
1,455	3.62	DSPOBJD	DSPOBJD	0B90	0001	COMPOSITE PIECE - DATA SPACE
1,264	3.14	QCAWAREA		19EF	0001	TEMPORARY - SPACE
1,246	3.10	HATT		0401	0001	LIBRARY
1,187	2.95	OPENBAD	A960126A	1AEF	007B	TEMPORARY - PROCESS CTL SPACE
1,093	2.72	SEIZE LOCK RANGE		0000	2081	HOLD RECORD SEG
1,012	2.52	QRNXDUMP		0203	0001	SERVICE PROGRAM
965	2.40	OPENBAD		0201	0001	PROGRAM
871	2.17	TESTIOC		0201	0001	PROGRAM
840	2.09	QSQENDAG		0201	0001	PROGRAM
837	2.08	QLEAWI		0203	0001	SERVICE PROGRAM
787	1.96	D2FB76C77200		0000	20D6	HEAP DATA SEGMENT TYPE
732	1.82	D7A7822472O0		0000	20BB	MODUL2 STATIC STORE
690	1.72	JUNK	QSPLJOB	1AEF	0006	TEMPORARY - PROCESS CTL SPACE
567	1.41	ILEAGNEW		0201	0001	PROGRAM
545	1.36	PF04	PF04	0B90	0001	COMPOSITE PIECE - DATA SPACE
522	1.30	PF03	PF03	0B90	0001	COMPOSITE PIECE - DATA SPACE
509	1.27	PF05	PF05	0B90	0001	COMPOSITE PIECE - DATA SPACE
495	1.23	PF02	PF02	0B90	0001	COMPOSITE PIECE - DATA SPACE
469	1.17	PF01	PF01	0B90	0001	COMPOSITE PIECE - DATA SPACE
450	1.12	QUSRSYS		0401	0001	LIBRARY
447	1.11	QDBGETM		0201	0001	PROGRAM
422	1.05	QJOBMSGQ		18A0	0001	JOB MESSAGE QUEUE
404	1.00	QDFTOWN		0801	0001	USER PROFILE
FINAL TOTALS						
TOTAL 34,191	85.05					

```
* * *  E N D  O F  R E P O R T  * * *
```

Figure 105. Page Faults by Object/Segment Name and Description

10.4.2 Report Title - Page Faults by Object and Job/Task.

This report is produced from Command Option - By Object and Job/Task.

```
Page faults by object and job/task.
Includes only objs/segs with 1% or more of all system faults.
Includes only jobs/tasks with 1% or more of the obj's/seg's faults.
         QUERY NAME . . . . . FLTOBJ3
         LIBRARY NAME . . . . SMTRACE
         FILE         LIBRARY      MEMBER       FORMAT
         FLTOBJ2      PFREXP2      PEXTRACE     FLTOBJ2
         FLTOBJ1      PFREXP2      PEXTRACE     FLTOBJ1
         FLT2         PFREXP2      PEXTRACE     FLT2
         TASKINFO     PFREXP2      PEXTRACE     TASKINFO
         DATE . . . . . 08/02/96
         TIME . . . . . 19:01:38
```

	Fault count	Object/Segment name and object type		Seg type	Percent of ALL system faults	Percent of this obj/seg faults	TDE number (hex)	Job/Task name	Job user	Job number
	4,543	FCFA2024DA00		0000 20D6	11.3	100.0	0000880E	ILEAGNEW	A960126A	053541
TOTAL	4,543				11.3	100.0				
	4,090	ILEAGNEW	A960126A	1AEF 0006	10.2	100.0	0000880E	ILEAGNEW	A960126A	053541
TOTAL	4,090				10.2	100.0				
	2,385	OPEN5		0201 0001	5.9	100.0	00008814	OPENBAD	A960126A	053546
TOTAL	2,385				5.9	100.0				
	1,789	*DESTROYED		0000 0000	4.5	90.6	00008814	OPENBAD	A960126A	053546
	99				.3	5.0	00008810	TSTIOC	A960126A	053543
	72				.2	3.7	00008408	JUNK	QSPLJOB	053464
TOTAL	1,960				4.9	99.3				
	1,929	TESTIO		0201 0001	4.8	100.0	00008810	TSTIOC	A960126A	053543
TOTAL	1,929				4.8	100.0				
	1,461	ILEAGN		0201 0001	3.6	100.0	0000880E	ILEAGNEW	A960126A	053541
TOTAL	1,461				3.6	100.0				
	1,455	DSPOBJD	DSPOBJD	0B90 0001	3.6	100.0	00008810	TSTIOC	A960126A	053543
TOTAL	1,455				3.6	100.0				
	621	QCAWAREA		19EF 0001	1.5	49.1	00008814	OPENBAD	A960126A	053546
	367				.9	29.0	00008810	TSTIOC	A960126A	053543
	276				.7	21.8	0000880E	ILEAGNEW	A960126A	053541
TOTAL	1,264				3.1	100.0				
	1,246	HATT		0401 0001	3.1	100.0	00008810	TSTIOC	A960126A	053543

	Fault count	Object/Segment name and object type		Seg type	Percent of ALL system faults	Percent of this obj/seg faults	TDE number (hex)	Job/Task name	Job user	Job number
TOTAL	1,246				3.1	100.0				
	1,187	OPENBAD	A960126A	1AEF 007B	3.0	100.0	00008814	OPENBAD	A960126A	053546
TOTAL	1,187				3.0	100.0				
	728	SEIZE LOCK RANGE		0000 2081	1.8	66.6	00008814	OPENBAD	A960126A	053546
	272				.7	24.9	0000880E	ILEAGNEW	A960126A	053541
	60				.2	5.5	00008408	JUNK	QSPLJOB	053464
	25				.1	2.3	00008810	TSTIOC	A960126A	053543
TOTAL	1,085				2.7	99.3				
	1,012	QRNXDUMP		0203 0001	2.5	100.0	0000880E	ILEAGNEW	A960126A	053541
TOTAL	1,012				2.5	100.0				
	965	OPENBAD		0201 0001	2.4	100.0	00008814	OPENBAD	A960126A	053546
TOTAL	965				2.4	100.0				
	871	TESTIOC		0201 0001	2.2	100.0	00008810	TSTIOC	A960126A	053543
TOTAL	871				2.2	100.0				
	833	QSQENDAG		0201 0001	2.1	99.2	0000880E	ILEAGNEW	A960126A	053541
TOTAL	833				2.1	99.2				
	828	QLEAWI		0203 0001	2.1	98.9	0000880E	ILEAGNEW	A960126A	053541
	9				.0	1.1	00008408	JUNK	QSPLJOB	053464
TOTAL	837				2.1	100.0				
	787	D2FB76C77200		0000 20D6	2.0	100.0	00008408	JUNK	QSPLJOB	053464
TOTAL	787				2.0	100.0				

Figure 106 (Part 1 of 2). page Faults by Object and Job/Task

```
             Fault Object/Segment           Seg  Percent of ALL Percent of this TDE number Job/Task name   Job        Job
             count name and                 type system faults  obj/seg faults  (hex)                     user       number
                   object type
               732 D7A782247200         0000 20BB          1.8          100.0     0000880E  ILEAGNEW        A960126A   053541
TOTAL          732                                         1.8          100.0
               690 JUNK      QSPLJOB    1AEF 0006          1.7          100.0     00008408  JUNK            QSPLJOB    053464
TOTAL          690                                         1.7          100.0
               567 ILEAGNEW             0201 0001          1.4          100.0     0000880E  ILEAGNEW        A960126A   053541
TOTAL          567                                         1.4          100.0
               545 PFO4      PFO4       0B90 0001          1.4          100.0     00008814  OPENBAD         A960126A   053546
TOTAL          545                                         1.4          100.0
               522 PFO3      PFO3       0B90 0001          1.3          100.0     00008814  OPENBAD         A960126A   053546
TOTAL          522                                         1.3          100.0
               509 PFO5      PFO5       0B90 0001          1.3          100.0     00008814  OPENBAD         A960126A   053546
TOTAL          509                                         1.3          100.0
               495 PFO2      PFO2       0B90 0001          1.2          100.0     00008814  OPENBAD         A960126A   053546
TOTAL          495                                         1.2          100.0
               469 PFO1      PFO1       0B90 0001          1.2          100.0     00008814  OPENBAD         A960126A   053546
TOTAL          469                                         1.2          100.0
               265 QUSRSYS              0401 0001           .7           58.9     00008814  OPENBAD         A960126A   053546
               153                                          .4           34.0     0000880E  ILEAGNEW        A960126A   053541
                30                                          .1            6.7     00008408  JUNK            QSPLJOB    053464
TOTAL          448                                         1.1           99.6


             Fault Object/Segment           Seg  Percent of ALL Percent of this TDE number Job/Task name   Job        Job
             count name and                 type system faults  obj/seg faults  (hex)                     user       number
                   object type
               447 QDBGETM              0201 0001          1.1          100.0     00008810  TSTIOC          A960126A   053543
TOTAL          447                                         1.1          100.0
               274 QJOBMSGQ             18A0 0001           .7           64.9     0000880E  ILEAGNEW        A960126A   053541
               139                                          .4           32.9     00008408  JUNK            QSPLJOB    053464
                 9                                          .0            2.1     00007F6C  P23ARTVKE       A960126A   053319
TOTAL          422                                         1.1          100.0
               404 QDFTOWN              0801 0001          1.0          100.0     00008810  TSTIOC          A960126A   053543
TOTAL          404                                         1.0          100.0
FINAL TOTALS
TOTAL       34,160                                        85.0        2,897.3
* * *  E N D  O F  R E P O R T  * * *
```

Figure 106 (Part 2 of 2). page Faults by Object and Job/Task

10.4.3 Report Title - Page Faults by Job/Task

This report is produced from Command Option - By Job/Task.

```
                                Page faults by Job/Task.
                                Includes jobs/tasks with 1% or more of all system faults.
                                    QUERY NAME . . . . . FLTTDE3
                                    LIBRARY NAME . . . . SMTRACE
                                    FILE         LIBRARY      MEMBER       FORMAT
                                    FLTTDE1      PFREXP2      PEXTRACE     FLTTDE1
                                    FLTTDE2      PFREXP2      PEXTRACE     FLTTDE2
                                    TASKINFO     PFREXP2      PEXTRACE     TASKINFO
                                    DATE . . . . . 08/02/96
                                    TIME . . . . . 19:01:52

             Fault  Percent of ALL  TDE       Job/Task name     Job         Job
             count  system faults   number                      user        number
                                    (hex)
            15,814         39.33    0000880E  ILEAGNEW          A960126A    053541
            12,117         30.14    00008814  OPENBAD           A960126A    053546
             7,370         18.33    00008810  TSTIOC            A960126A    053543
             4,498         11.19    00008408  JUNK              QSPLJOB     053464
FINAL TOTALS
TOTAL       39,799         98.99
* * *  E N D  O F  R E P O R T  * * *
```

Figure 107. Page Faults by Job/Task

10.4.4 Report Title - Page Faults by Job/Task and Object Name/Segment Type

This report is produced from Command Option - By Job/Task and Object/Seg.

```
Page faults by Job/Task and object name.
Includes Jobs/Tasks with 1% or more of all faults.
Include objects with 1% or more of included TDE's faults.
    QUERY NAME . . . . . FLTTDE03
    LIBRARY NAME . . . . SMTRACE
    FILE         LIBRARY      MEMBER       FORMAT
    FLTTDE01     PFREXP2      PEXTRACE     FLTTDE01
    FLTTDE02     PFREXP2      PEXTRACE     FLTTDE02
    FLTTDE2      PFREXP2      PEXTRACE     FLTTDE2
    TASKINFO     PFREXP2      PEXTRACE     TASKINFO
    DATE . . . . . 08/02/96
    TIME . . . . . 19:01:56
```

	Fault count	TDE number (hex)	Job/Task name	Job user	Job number	% this TDE's flts	% ALL sys flts	Object name and object type		Segment type
	4,543	0000880E	ILEAGNEW	A960126A	053541	28.7	11.3	FCFA2024DA00	0000	20D6
	4,090					25.9	10.2	ILEAGNEW A960126A	1AEF	0006
	1,461					9.2	3.6	ILEAGN	0201	0001
	1,012					6.4	2.5	QRNXDUMP	0203	0001
	833					5.3	2.1	QSQENDAG	0201	0001
	828					5.2	2.1	QLEAWI	0203	0001
	732					4.6	1.8	D7A7822472O0	0000	20BB
	567					3.6	1.4	ILEAGNEW	0201	0001
	281					1.8	.7	APLIST	19EF	0001
	280					1.8	.7	D56C3B528F00	0000	20D5
	276					1.8	.7	QCAWAREA	19EF	0001
	274					1.7	.7	QJOBMSGQ	18A0	0001
	272					1.7	.7	SEIZE LOCK RANGE	0000	2081
	160					1.0	.4	QRNXIE	0203	0001
TOTAL	15,609					98.7	38.8			
	2,385	00008814	OPENBAD	A960126A	053546	19.7	5.9	OPEN5	0201	0001
	1,789					14.8	4.5	*DESTROYED	0000	0000
	1,187					9.8	3.0	OPENBAD A960126A	1AEF	007B
	965					8.0	2.4	OPENBAD	0201	0001
	728					6.0	1.8	SEIZE LOCK RANGE	0000	2081
	621					5.1	1.5	QCAWAREA	19EF	0001
	545					4.5	1.4	PF04 PF04	0B90	0001
	522					4.3	1.3	PF03 PF03	0B90	0001
	509					4.2	1.3	PF05 PF05	0B90	0001
	495					4.1	1.2	PF02 PF02	0B90	0001
	469					3.9	1.2	PF01 PF01	0B90	0001
	308					2.5	.8	PF01	1901	0001
	308					2.5	.8	PF02	1901	0001
	306					2.5	.8	PF05	1901	0001
	305					2.5	.8	PF04	1901	0001
	304					2.5	.8	PF03	1901	0001
	265					2.2	.7	QUSRSYS	0401	0001
TOTAL	12,011					99.1	29.9			
	1,929	00008810	TSTIOC	A960126A	053543	26.2	4.8	TESTIO	0201	0001

Figure 108 (Part 1 of 2). Page Faults by Job/Task and Object Name

```
             Fault TDE      Job/Task name    Job        Job      % this      % ALL   Object name and            Segment
             count number                    user       number   TDE's       sys     object type                type
                   (hex)                                        flts        flts
             1,455 00008810 TSTIOC           A960126A   053543     19.7        3.6   DSPOBJD   DSPOBJD    0B90   0001
             1,246                                                16.9        3.1   HATT                 0401   0001
               871                                                11.8        2.2   TESTIOC              0201   0001
               447                                                 6.1        1.1   QDBGETM              0201   0001
               404                                                 5.5        1.0   QDFTOWN              0801   0001
               385                                                 5.2        1.0   DSPOBJD              1901   0001
               367                                                 5.0         .9   QCAWAREA             19EF   0001
               112                                                 1.5         .3   QRNXIE               0203   0001
                99                                                 1.3         .3   *DESTROYED           0000   0000
TOTAL        7,315                                                99.3       18.2
               787 00008408 JUNK           QSPLJOB    053464    17.5        2.0   D2FB76C7720O         0000   20D6
               690                                                15.3        1.7   JUNK      QSPLJOB    1AEF   0006
               371                                                 8.3         .9   QSOSRV2              0203   0001
               266                                                 5.9         .7   QTMPLPRC             0201   0001
               214                                                 4.8         .5   QSOKERN3             0203   0001
               188                                                 4.2         .5   L/L RANGE 1          0000   0000
               143                                                 3.2         .4   QSOSRV1              0203   0001
               139                                                 3.1         .4   QJOBMSGQ             18A0   0001
               110                                                 2.5         .3   SQCCSID1             0ED2   0001
                81                                                 1.8         .2   QTQICONV             0203   0001
                72                                                 1.6         .2   *DESTROYED           0000   0000
                72                                                 1.6         .2   QC2UTIL1             0203   0001
                72                                                 1.6         .2   QPOLLIB1             0203   0001
                69                                                 1.5         .2   E43BF962E5OO         0000   20AC
                67                                                 1.5         .2   QATOCTCPIPCONFIG     0C90   0001
                66                                                 1.5         .2   QYPPRT               0203   0001
                61                                                 1.4         .2   EEEO5252CBOO         0000   20BB
                60                                                 1.3         .2   QSO_DNS_INDEX        0EEF   0001
                60                                                 1.3         .2   SEIZE LOCK RANGE     0000   2081
                52                                                 1.2         .1   QATOCTCPIPCONFIG     0B90   0001
                50                                                 1.1         .1   F836A3DBEAOO         0000   20AC
                50                                                 1.1         .1   QSPRMTDR             0201   0001
                49                                                 1.1         .1   QSECOFR              0801   0001
                45                                                 1.0         .1   QPOSSRV3             0203   0001
                45                                                 1.0         .1   QTCP                 0401   0001

             Fault TDE      Job/Task name    Job        Job      % this      % ALL   Object name and            Segment
             count number                    user       number   TDE's       sys     object type                type
                   (hex)                                        flts        flts
TOTAL        3,879                                                86.2        9.6
FINAL TOTALS
TOTAL       38,814                                               383.4       96.6
* * *  E N D   O F   R E P O R T  * * *
```

Figure 108 (Part 2 of 2). Page Faults by Job/Task and Object Name

10.4.5 Report Title - Object Faults within MI Program within Job

This report is produced from Command Option - By Mainstore Pool.

```
     Object faults within MI pgm, within Job.
QUERY NAME . . . . . FJOBPGMOB6
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
FJOBPGMOB5   PFREXP2      PEXTRACE     FJOBPGMOB5
TASKINFO     PFREXP2      PEXTRACE     TASKINFO
DATE . . . . . 08/02/96
TIME . . . . . 19:02:33
```

```
08/02/96  19:02:33                                                                                  PAGE    1
TDE       Process     Job         Job            Job    MIMOD              PGM    NAMETYPE                        OBJ
          job name    user        number          TOTAL                     TOTAL                                  TOTAL
0000880E  ILEAGNEW    A960126A    053541         15,814  ILEAGNEW          6,503  FCFA2024DA00          0000      2,754
                                                                                  QRNXDUMP              0203      1,012
                                                                                  ILEAGNEW  A960126A    1AEF        980
                                                                                  ILEAGN                0201        757
                                                                                  ILEAGNEW              0201        558
                                                                                  D56C3B528F00          0000        280
                                                                                  QRNXIE                0203        160
                                                         QSQENDAG         3,219  ILEAGNEW  A960126A    1AEF      1,523
                                                                                  FCFA2024DA00          0000        882
                                                                                  QSQENDAG              0201        282
                                                                                  QJOBMSGQ              18A0        274
                                                                                  D7A7822472O0          0000        258
                                                         QLEAWI           1,590  QLEAWI                0203        828
                                                                                  D7A7822472O0          0000        278
                                                                                  FCFA2024DA00          0000        259
                                                                                  ILEAGNEW  A960126A    1AEF        225
                                                         QCLCLCPR         1,442  ILEAGN                0201        424
                                                                                  QCAWAREA              19EF        274
                                                                                  SEIZE LOCK RANGE      0000        272

08/02/96  19:02:33                                                                                  PAGE    2
TDE       Process     Job         Job            Job    MIMOD              PGM    NAMETYPE                        OBJ
          job name    user        number          TOTAL                     TOTAL                                  TOTAL
0000880E  ILEAGNEW    A960126A    053541         15,814  QCLCLCPR         1,442  D7A7822472O0          0000        196
                                                                                  QUSRSYS               0401        153
                                                                                  ILEAGNEW  A960126A    1AEF        111
                                                         *NONE              867  FCFA2024DA00          0000        567
                                                                                  ILEAGNEW  A960126A    1AEF        297
                                                         QDMRCLSE           855  QSQENDAG              0201        551
                                                                                  ILEAGNEW  A960126A    1AEF        252
                                                                                  FCFA2024DA00          0000         49
                                                         ILEAGN             509  ILEAGN                0201        280
                                                                                  ILEAGNEW  A960126A    1AEF        216
                                                                                  FCFA2024DA00          0000         13
                                                         QOLCLNUP           280  APLIST                19EF        278
                                                         NSED INTER         205  ILEAGNEW  A960126A    1AEF        205
                                                         QLEDAGE            157  ILEAGNEW  A960126A    1AEF        144
                                                                                  FCFA2024DA00          0000         13
                                                         QC2UTIL1           135  ILEAGNEW  A960126A    1AEF        135
                                                         QWVPDAGE            25  QWVPDAGE              0201         25
00008814  OPENBAD     A960126A    053546         12,117  OPEN5            2,215  OPEN5                 0201      1,658
                                                                                  *DESTROYED            0000        438
```

Figure 109 (Part 1 of 5). Object Faults within MI Program within Job

```
08/02/96  19:02:33                                                                                                PAGE    3
TDE       Process     Job         Job           Job    MIMOD              PGM    NAMETYPE                                OBJ
          job name    user        number        TOTAL                     TOTAL                                          TOTAL
00008814  OPENBAD     A960126A    053546       12,117  OPEN5              2,215  OPENBAD   A960126A    1AEF            119
                                                       QDBOPEN            1,887  SEIZE LOCK RANGE      0000            505
                                                                                 PF01      PF01        0B90            301
                                                                                 PF02      PF02        0B90            289
                                                                                 PF03      PF03        0B90            276
                                                                                 PF04      PF04        0B90            235
                                                                                 PF05      PF05        0B90            185
                                                                                 OPEN5                 0201             71
                                                                                 *DESTROYED            0000             11
                                                       QCLCLCPR           1,823  OPENBAD               0201            627
                                                                                 OPEN5                 0201            550
                                                                                 QCAWAREA              19EF            303
                                                                                 QUSRSYS               0401            265
                                                                                 OPENBAD   A960126A    1AEF             54
                                                                                 QRNXIE                0203             24
                                                       QDBGETM            1,678  *DESTROYED            0000            565
                                                                                 PF05      PF05        0B90            310
                                                                                 OPENBAD   A960126A    1AEF            245
                                                                                 PF04      PF04        0B90            243

08/02/96  19:02:33                                                                                                PAGE    4
TDE       Process     Job         Job           Job    MIMOD              PGM    NAMETYPE                                OBJ
          job name    user        number        TOTAL                     TOTAL                                          TOTAL
00008814  OPENBAD     A960126A    053546       12,117  QDBGETM            1,678  PF03      PF03        0B90            123
                                                                                 SEIZE LOCK RANGE      0000            115
                                                                                 PF02      PF02        0B90             61
                                                                                 PF01      PF01        0B90             16
                                                       QDMCOPEN           1,558  PF01                  1901            308
                                                                                 PF02                  1901            308
                                                                                 PF05                  1901            306
                                                                                 PF04                  1901            305
                                                                                 PF03                  1901            304
                                                                                 OPENBAD   A960126A    1AEF             22
                                                       QDMCLOSE           1,066  *DESTROYED            0000            456
                                                                                 PF01      PF01        0B90            152
                                                                                 PF02      PF02        0B90            145
                                                                                 PF03      PF03        0B90            123
                                                                                 SEIZE LOCK RANGE      0000            108
                                                                                 PF04      PF04        0B90             67
                                                                                 PF05      PF05        0B90             14
                                                       OPENBAD              840  OPENBAD               0201            328
                                                                                 QCAWAREA              19EF            315
                                                M05

08/02/96  19:02:33                                                                                                PAGE    5
TDE       Process     Job         Job           Job    MIMOD              PGM    NAMETYPE                                OBJ
          job name    user        number        TOTAL                     TOTAL                                          TOTAL
00008814  OPENBAD     A960126A    053546       12,117  OPENBAD              840  OPENBAD   A960126A    1AEF            170
                                                                                 OPEN5                 0201             27
                                                       QRNXIO               462  *DESTROYED            0000            319
                                                                                 OPENBAD   A960126A    1AEF            143
                                                       *NONE                306  OPENBAD   A960126A    1AEF            218
                                                                                 OPEN5                 0201             79
                                                       QLEAWI               126  OPENBAD   A960126A    1AEF            126
                                                       SelectRUt             80  OPENBAD   A960126A    1AEF             80
00008810  TSTIOC      A960126A    053543        7,370  QCLCLCPR           2,952  HATT                  0401          1,246
                                                                                 TESTIO                0201            923
                                                                                 QDFTOWN               0801            404
                                                                                 QCAWAREA              19EF            365
                                                       QDBGETM            1,751  DSPOBJD   DSPOBJD     0B90          1,211
                                                                                 QDBGETM               0201            447
                                                                                 *DESTROYED            0000             83
                                                       TESTIOC              982  TESTIOC               0201            861
                                                                                 QRNXIE                0203            112
                                                       TESTIO               932  TESTIO                0201            925
                                                       QDMCOPEN             386  DSPOBJD               1901            385
```

Figure 109 (Part 2 of 5). Object Faults within MI Program within Job

```
08/02/96  19:02:33                                                                                                PAGE    6
TDE       Process    Job        Job          Job     MIMOD              PGM    NAMETYPE                                 OBJ
          job name   user       number       TOTAL                      TOTAL                                           TOTAL
00008810  TSTIOC     A960126A   053543       7,370   QDBOPEN            266    DSPOBJD   DSPOBJD    0B90                  207
                                                                              TESTIO                0201                   56
                                                     QDMCLOSE            57    DSPOBJD   DSPOBJD    0B90                   37
                                                                              SEIZE LOCK RANGE      0000                   15
                                                     *NONE               16    TESTIO                0201                   16
00008408  JUNK       QSPLJOB    053464       4,498   QCATRS             860    D2FB76C7720O          0000                  330
                                                                              QYPPRT                0203                   48
                                                                              QPOLLIB1              0203                   45
                                                                              QSOSRV2               0203                   42
                                                                              QTMPLPRC              0201                   39
                                                                              QSOSRV1               0203                   38
                                                                              QTQICONV              0203                   34
                                                                              QPOSSRV3              0203                   33
                                                                              F836A3DBEA0O          0000                   26
                                                                              QPOLDC1               0203                   26
                                                                              QPOSSRV4              0203                   26
                                                                              QPOWPID               0203                   26
                                                                              QPOWPIDI              0203                   26
                                                                              QTQICVC2              0203                   26
                                                M05

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TDE       Process    Job        Job          Job     MIMOD              PGM    NAMETYPE                                 OBJ
          job name   user       number       TOTAL                      TOTAL                                           TOTAL
00008408  JUNK       QSPLJOB    053464       4,498   QCATRS             860    QWPZHPT1              0203                   26
                                                                              JUNK      QSPLJOB     1AEF                   16
                                                                              QTCP                  0401                   14
                                                                              QTMPCKP               0201                   14
                                                                              D1EDE9BC470O          0000                   13
                                                                              QJOBMSGQ              18A0                   12
                                                     QSOKERN3            710    L/L RANGE 1           0000                  164
                                                                              QSOKERN3              0203                  118
                                                                              QSOSRV2               0203                   78
                                                                              E43BF962E50O          0000                   69
                                                                              QSOSRV1               0203                   63
                                                                              QSO_DNS_INDEX         0EEF                   60
                                                                              QPOLLFS1              0203                   30
                                                                              ECB9E6FEOE0O          0000                   26
                                                                              QTMPLPRC              0201                   21
                                                                              JUNK      QSPLJOB     1AEF                   17
                                                                              D2FB76C7720O          0000                   15
                                                                              QSECOFR               0801                   15
                                                                              EEE05252CB0O          0000                   14

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TDE       Process    Job        Job          Job     MIMOD              PGM    NAMETYPE                                 OBJ
          job name   user       number       TOTAL                      TOTAL                                           TOTAL
00008408  JUNK       QSPLJOB    053464       4,498   QSOKERN3           710    FCAE14909A0O          0000                   14
                                                     *NONE              603    JUNK      QSPLJOB     1AEF                  222
                                                                              D2FB76C7720O          0000                  129
                                                                              QC2UTIL1              0203                   42
                                                                              QSOKERN3              0203                   36
                                                                              QSOSRV2               0203                   36
                                                                              *DESTROYED            0000                   24
                                                                              QTMPLPRC              0201                   24
                                                                              QTQSRVP2              0203                   24
                                                                              C517F58CA90O          0000                   12
                                                                              QSOSRV1               0203                   12
                                                                              QTQICONV              0203                   12
                                                                              SQCCSID1              0ED2                   12
                                                     QDMCOPEN           319    D2FB76C7720O          0000                  101
                                                                              QSOSRV2               0203                   80
                                                                              JUNK      QSPLJOB     1AEF                   35
                                                                              QUSRSYS               0401                   30
                                                                              QSECOFR               0801                   28
                                                                              EEE05252CB0O          0000                   19
```

Figure 109 (Part 3 of 5). Object Faults within MI Program within Job

```
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TDE       Process     Job         Job          Job    MIMOD              PGM    NAMETYPE                              OBJ
          job name    user        number       TOTAL                     TOTAL                                        TOTAL
00008408  JUNK        QSPLJOB     053464       4,498  QDMCOPEN            319  QATOCTCPIP            1901              17
                                                     QTMPLPRC            263  QTMPLPRC              0201             135
                                                                              JUNK      QSPLJOB     1AEF              40
                                                                              D2FB76C7720O          0000              35
                                                                              QSOSRV1               0203              12
                                                                              QSOSRV2               0203              12
                                                     QSOSRV2             254  QSOSRV2               0203             111
                                                                              JUNK      QSPLJOB     1AEF              90
                                                                              D2FB76C7720O          0000              15
                                                                              QSOKERN3              0203              12
                                                                              QSYS                  0401              12
                                                                              QTQICONV              0203              12
                                                     QDBOPEN             250  SQCCSID1              0ED2              74
                                                                              SEIZE LOCK RANGE      0000              38
                                                                              JUNK      QSPLJOB     1AEF              34
                                                                              QDBOPEN               0201              27
                                                                              QTMPLPRC              0201              25
                                                                              QATOCTCPIPCONFIG      0B90              17
                                                                              QATOCTCPIPCONFIG      0C90              16

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TDE       Process     Job         Job          Job    MIMOD              PGM    NAMETYPE                              OBJ
          job name    user        number       TOTAL                     TOTAL                                        TOTAL
00008408  JUNK        QSPLJOB     053464       4,498  QDBOPEN             250  QATTR                 1951              13
                                                     QCMDEXC             209  D2FB76C7720O          0000              75
                                                                              JUNK      QSPLJOB     1AEF              19
                                                                              F836A3DBEA0O          0000              12
                                                                              QMHRSNEM              0201              12
                                                                              QPOLLIB1              0203              12
                                                                              QPOSSRV3              0203              12
                                                                              QSOSRV1               0203              12
                                                                              QSOSRV2               0203              12
                                                                              QYPPRT                0203              12
                                                                              QTQICONV              0203              11
                                                     QMHSNDPM            141  QJOBMSGQ              18A0              47
                                                                              QTCPMSGF              0E03              30
                                                                              QCPFMSG               0E03              26
                                                                              QTCP                  0401              18
                                                     QDBGETKY            106  QATOCTCPIPCONFIG      0C90              39
                                                                              L/L RANGE 1           0000              24
                                                                              QATOCTCPIPCONFIG      0B90              23
                                                                              JUNK      QSPLJOB     1AEF              16
                                                M05

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TDE       Process     Job         Job          Job    MIMOD              PGM    NAMETYPE                              OBJ
          job name    user        number       TOTAL                     TOTAL                                        TOTAL
00008408  JUNK        QSPLJOB     053464       4,498  QC2UTIL1             86  QC2UTIL1              0203              24
                                                                              JUNK      QSPLJOB     1AEF              22
                                                                              F836A3DBEA0O          0000              12
                                                     QMHRSNEM             58  QSPRMTDR              0201              18
                                                                              QMHRSNEM              0201              12
                                                     QLIDLOBJ             41  QJOBMSGQ              18A0              17
                                                     QSOSRV1              37  QSOKERN3              0203              30
                                                     QTQICONV             36  D2FB76C7720O          0000              12
                                                                              QTQICONV              0203              12
                                                                              QTQICVC2              0203              12
                                                     QSQENDAG             36  JUNK      QSPLJOB     1AEF              20
                                                     QSPRMTDR             33  QSPRMTDR              0201              26
                                                     QLICHLLE             32  QLICHLLE              0201              13
                                                                              SEIZE LOCK RANGE      0000              12
                                                     QTQICVC2             30  JUNK      QSPLJOB     1AEF              18
                                                                              D2FB76C7720O          0000              12
                                                     QCANPARS             30  SQCCSID1              0ED2              24
                                                     QMHMOVPM             29  QJOBMSGQ              18A0              25
                                                     QPOLLIB1             28  D2FB76C7720O          0000              12
```

Figure 109 (Part 4 of 5). Object Faults within MI Program within Job

```
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TDE       Process     Job         Job           Job    MIMOD              PGM    NAMETYPE                                OBJ
          job name    user        number        TOTAL                     TOTAL                                          TOTAL
00008408  JUNK        QSPLJOB     053464        4,498  QMHPDEH             27    QJOBMSGQ              18A0              15
                                                                                 JUNK      QSPLJOB     1AEF              12
                                                       QCAIEXIT            25    *DESTROYED            0000              12
                                                       QDMCLOSE            24    QATOCTCPIPCONFIG      0B90              12
                                                                                 QATOCTCPIPCONFIG      0C90              12
                                                       QUSRJOBI            22    JUNK      QSPLJOB     1AEF              16
                                                       QPOLLFS1            18    QSOKERN3              0203              18
                                                       QDBCLOSE            13    *DESTROYED            0000              12
00007F6C  P23ARTVKE   A960126A    053319          231  QWCCDSAC           166    QWCBTO1               19D0              88
0000881E  PEXTRACE    A960126A    053555          132  *NONE               19    SM PERM DIR SEGMENT   0000              17
00000116                            13  *NONE                 13    E43BF962E500          0000              12
* * *  E N D  O F  R E P O R T  * * *
```

Figure 109 (Part 5 of 5). Object Faults within MI Program within Job

10.4.6 Report Title - Page Faults by Mainstore Pool

This report is produced from Command Option - By Mainstore Pool.

```
                                    Page faults by mainstore pool.
                                QUERY NAME . . . . . FLTPOOL2
                                LIBRARY NAME . . . . SMTRACE
                                FILE         LIBRARY      MEMBER       FORMAT
                                FLTPOOL1     PFREXP2      PEXTRACE     FLTPOOL1
                                FLT2         PFREXP2      PEXTRACE     FLT2
                                DATE . . . . . . . . 08/02/96
                                TIME . . . . . . . . 19:02:34

Mainstore          Fault  % ALL
pool               count  system faults
(hex)
   07             35,305         87.81
   03              4,498         11.19
   04                222           .55
   02                124           .31
   01                 56           .14
     FINAL TOTALS
     TOTAL        40,205        100.00
* * *  E N D  O F  R E P O R T  * * *
```

Figure 110. Page Faults by Mainstore Pool

10.4.7 Report Title - % of Faults by Pool and Object

This report is produced from Command Option - By Mainstore Pool.

```
                    % of faults by pool and obj
          QUERY NAME . . . . . FLTSOBJ4
          LIBRARY NAME . . . . SMTRACE
          FILE         LIBRARY      MEMBER       FORMAT
          FLTSOBJ3     PFREXP2      PEXTRACE     FLTSOBJ3
          FLTSOBJ      PFREXP2      PEXTRACE     FLTSOBJ
          DATE . . . . . . . . 08/02/96
          TIME . . . . . . . . 19:02:37


08/02/96  19:02:37                                                                    PAGE    1
POOL  Object/segment            % of system  % of pool  # of Flts  DESC
      name and type
 07                                    87.8       100.0       35,305
      FCFA2024DA00         0000        11.3        12.9        4,543  HEAP DATA SEGMENT TYPE
      ILEAGNEW  A960126A   1AEF        10.2        11.6        4,090  TEMPORARY - PROCESS CTL SPACE
      OPEN5                0201         5.9         6.8        2,385  PROGRAM
      TESTIO               0201         4.8         5.5        1,929  PROGRAM
      *DESTROYED           0000         4.7         5.3        1,888
      ILEAGN               0201         3.6         4.1        1,461  PROGRAM
      DSPOBJD   DSPOBJD    0B90         3.6         4.1        1,455  COMPOSITE PIECE - DATA SPACE
      QCAWAREA             19EF         3.1         3.6        1,264  TEMPORARY - SPACE
      HATT                 0401         3.1         3.5        1,246  LIBRARY
      OPENBAD   A960126A   1AEF         3.0         3.4        1,187  TEMPORARY - PROCESS CTL SPACE
      SEIZE LOCK RANGE     0000         2.5         2.9        1,025  HOLD RECORD SEG
      QRNXDUMP             0203         2.5         2.9        1,012  SERVICE PROGRAM
      OPENBAD              0201         2.4         2.7          965  PROGRAM
      TESTIOC              0201         2.2         2.5          871  PROGRAM
      QSQENDAG             0201         2.1         2.4          833  PROGRAM
      QLEAWI               0203         2.1         2.3          828  SERVICE PROGRAM
      D7A7822472O0         0000         1.8         2.1          732  MODUL2 STATIC STORE
      ILEAGNEW             0201         1.4         1.6          567  PROGRAM
      PF04      PF04       0B90         1.4         1.5          545  COMPOSITE PIECE - DATA SPACE
      PF03      PF03       0B90         1.3         1.5          522  COMPOSITE PIECE - DATA SPACE
      PF05      PF05       0B90         1.3         1.4          509  COMPOSITE PIECE - DATA SPACE
      PF02      PF02       0B90         1.2         1.4          495  COMPOSITE PIECE - DATA SPACE
      PF01      PF01       0B90         1.2         1.3          469  COMPOSITE PIECE - DATA SPACE
      QDBGETM              0201         1.1         1.3          447  PROGRAM
      QUSRSYS              0401         1.0         1.2          420  LIBRARY
      QDFTOWN              0801         1.0         1.1          404  USER PROFILE
      DSPOBJD              1901         1.0         1.1          385  FILE
 03                                    11.2       100.0        4,498
      D2FB76C772O0         0000         2.0        17.5          787  HEAP DATA SEGMENT TYPE
      JUNK      QSPLJOB    1AEF         1.7        15.3          690  TEMPORARY - PROCESS CTL SPACE
* * *  E N D  O F  R E P O R T  * * *
```

Figure 111. Percentage of Faults by Pool and Object

10.4.8 Report Title - Faults by POOL/TDE/OBJ That Are >= 1.0% of the System Page Faults

This report is produced from Command Option - By Mainstore Pool.

```
          Flt's by POOL/TDE/OBJ that are
          >= 1.0% of the system faults
QUERY NAME . . . . . FLTTDEX8
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
FLTTDEX7     PFREXP2      PEXTRACE     FLTTDEX7
TASKINFO     PFREXP2      PEXTRACE     TASKINFO
DATE . . . . . . . . 08/02/96
TIME . . . . . . . . 19:02:51
```

```
08/02/96  19:02:51                                                                                                    PAGE    1
POOL  TDE       Job/Task name     Job         Job     Object/Segment             Segment     Num or  % of     % of      % of
      number                      user        number  name and type              type        faults  SYSTEM   this TDE  this POOL
      (hex)                                                                                    faults   faults    faults
 07   00008814  OPENBAD           A960126A    053546  OPEN5                0201  0001        2,385     5.9      19.7       6.8
                                                      *DESTROYED           0000  0000        1,789     4.4      14.8       5.1
                                                      OPENBAD   A960126A   1AEF  007B        1,187     3.0       9.8       3.4
                                                      OPENBAD              0201  0001          965     2.4       8.0       2.7
                                                      SEIZE LOCK RANGE     0000  2081          728     1.8       6.0       2.1
                                                      QCAWAREA             19EF  0001          621     1.5       5.1       1.8
                                                      PF04      PF04       0B90  0001          545     1.4       4.5       1.5
                                                      PF03      PF03       0B90  0001          522     1.3       4.3       1.5
                                                      PF05      PF05       0B90  0001          509     1.3       4.2       1.4
                                                      PF02      PF02       0B90  0001          495     1.2       4.1       1.4
                                                      PF01      PF01       0B90  0001          469     1.2       3.9       1.3
      00008810  TSTIOC             A960126A    053543  TESTIO               0201  0001        1,929     4.8      26.2       5.5
                                                      DSPOBJD   DSPOBJD    0B90  0001        1,455     3.6      19.7       4.1
                                                      HATT                 0401  0001        1,246     3.1      16.9       3.5
                                                      TESTIOC              0201  0001          871     2.2      11.8       2.5
                                                      QDBGETM              0201  0001          447     1.1       6.1       1.3
                                                      QDFTOWN              0801  0001          404     1.0       5.5       1.1
                                                      DSPOBJD              1901  0001          385     1.0       5.2       1.1
      0000880E  ILEAGNEW          A960126A    053541  FCFA2024DA00         0000  20D6        4,543    11.3      28.7      12.9
                                                      ILEAGNEW  A960126A   1AEF  0006        4,090    10.2      25.9      11.6
                                                      ILEAGN               0201  0001        1,461     3.6       9.2       4.1
                                                      QRNXDUMP             0203  0001        1,012     2.5       6.4       2.9
                                                      QSQENDAG             0201  0001          833     2.1       5.3       2.4
                                                      QLEAWI               0203  0001          828     2.1       5.2       2.3
                                                      D7A782247200         0000  20BB          732     1.8       4.6       2.1
                                                      ILEAGNEW             0201  0001          567     1.4       3.6       1.6
 03   00008408  JUNK              QSPLJOB     053464  D2FB76C77200         0000  20D6          787     2.0      17.5      17.5
                                                      JUNK      QSPLJOB    1AEF  0006          690     1.7      15.3      15.3
* * *  E N D  O F  R E P O R T  * * *
```

Figure 112. Faults by Pool/TDE/Object that are > = 1 % of the System Faults

10.4.9 Report Title - Faults by MI Program that are >= %1.0 of Total System Faults

This report is produced from Command Option - By MI PGM.

```
                Faults by program that are 1% or more of total system faults
                     QUERY NAME . . . . . FLTMIPGMA2
                     LIBRARY NAME . . . . SMTRACE
                     FILE         LIBRARY      MEMBER       FORMAT
                     FLTMIPGMA    PFREXP2      PEXTRACE     FLTMIPGMA
                     FLTMIPGMA1   PFREXP2      PEXTRACE     FLTMIPGMA1
                     DATE . . . . . 08/02/96
                     TIME . . . . . 19:03:03


08/02/96  19:03:03       PAGE    1
Program     % of System     Total
            Faults          Faults
               100.0        40,205
ILEAGNEW        16.2         6,503
QCLCLCPR        15.5         6,218
QDBGETM          8.5         3,429
QSQENDAG         8.1         3,255
QDBOPEN          6.0         2,403
QDMCOPEN         5.6         2,268
OPEN5            5.5         2,215
*NONE            4.6         1,843
QLEAWI           4.3         1,742
QDMCLOSE         2.9         1,147
TESTIOC          2.4           982
TESTIO           2.3           932
QCATRS           2.1           864
QDMRCLSE         2.1           861
OPENBAD          2.1           840
QSOKERN3         1.8           710
ILEAGN           1.3           509
QRNXIO           1.2           464
                                          M05


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* * *  E N D  O F  R E P O R T  * * *
```

Figure 113. Faults by MI Program that are > = 1 % of Total System Faults

10.4.10 Report Title - Page Faults by Program and Object

This report is produced from Command Option - By MI PGM.

```
Page faults by program and object.
Includes only programs with 1% or more of system faults
and objects with 1% or more of the programs' faults
   QUERY NAME . . . . . FLTMIOBJ5
   LIBRARY NAME . . . . SMTRACE
   FILE         LIBRARY      MEMBER       FORMAT
   FLTMIOBJ4A   PFREXP2      PEXTRACE     FLTMIOBJ4A
   FLTMIOBJ1    PFREXP2      PEXTRACE     FLTMIOBJ1
   DATE . . . . . 08/02/96
   TIME . . . . . 19:03:19
```

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Program	Program faults	% of SYS faults	Object name and type		Segment Type	Segment Type Description	% of program faults	# of Obj's Faults
ILEAGNEW	6,503	16.2					100.0	6,503
			FCFA2O24DA0O	0000	20D6	HEAP DATA SEGMENT TYPE	42.3	2,754
			QRNXDUMP	0203	0001	MI SYSTEM OBJ BASE SEGMENT	15.6	1,012
			ILEAGN	0201	0001	MI SYSTEM OBJ BASE SEGMENT	11.6	757
			D56C3B528F0O	0000	20D5	HEAP CONTROL SEGMENT	4.3	280
			QRNXIE	0203	0001	MI SYSTEM OBJ BASE SEGMENT	2.5	160
QCLCLCPR	6,218	15.5					100.0	6,218
			HATT	0401	0001	MI SYSTEM OBJ BASE SEGMENT	20.0	1,246
			QCAWAREA	19EF	0001	MI SYSTEM OBJ BASE SEGMENT	15.1	942
			QUSRSYS	0401	0001	MI SYSTEM OBJ BASE SEGMENT	6.8	420
			QDFTOWN	0801	0001	MI SYSTEM OBJ BASE SEGMENT	6.5	404
			SEIZE LOCK RANGE	0000	2081	HOLD RECORD SEG	4.4	272
			D7A782247200	0000	20BB	MODUL2 STATIC STORE	3.2	196
			ILEAGNEW A960126A	1AEF	0006	IWA	1.8	111
QDBGETM	3,429	8.5					100.0	3,429
			*DESTROYED	0000	0000		18.9	648
			QDBGETM	0201	0001	MI SYSTEM OBJ BASE SEGMENT	13.0	447
			OPENBAD A960126A	1AEF	007C	USER-DOMAIN PROCESS SEG	7.1	245

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Program	Program faults	% of SYS faults	Object name and type		Segment Type	Segment Type Description	% of program faults	# of Obj's Faults
QDBGETM	3,429	8.5	SEIZE LOCK RANGE	0000	2081	HOLD RECORD SEG	3.6	125
			PF04 PF04	0B90	0001	MI SYSTEM OBJ BASE SEGMENT	3.3	112
					0001	MI SYSTEM OBJ BASE SEGMENT	2.5	85
			PF05 PF05	0B90	0001	MI SYSTEM OBJ BASE SEGMENT	2.2	75
			PF03 PF03	0B90	0001	MI SYSTEM OBJ BASE SEGMENT	2.0	68
			PF05 PF05	0B90	0001	MI SYSTEM OBJ BASE SEGMENT	1.3	46
					0001	MI SYSTEM OBJ BASE SEGMENT	1.1	37
			PF03 PF03	0B90	0001	MI SYSTEM OBJ BASE SEGMENT	1.1	37
			PF02 PF02	0B90	0001	MI SYSTEM OBJ BASE SEGMENT	1.0	34
QSQENDAG	3,255	8.1					100.0	3,255
			ILEAGNEW A960126A	1AEF	0006	IWA	31.9	1,038
			FCFA2O24DA0O	0000	20D6	HEAP DATA SEGMENT TYPE	27.1	882
			QJOBMSGQ	18A0	0001	MI SYSTEM OBJ BASE SEGMENT	8.5	276
			D7A782247200	0000	20BB	MODUL2 STATIC STORE	7.9	258
			QSQENDAG	0201	0022	CONSTANT SPACE SEGMENT	6.1	199
					0022	CONSTANT SPACE SEGMENT	2.3	74
QDBOPEN	2,403	6.0					100.0	2,403
			SEIZE LOCK RANGE	0000	2081	HOLD RECORD SEG	22.6	543
			PF01 PF01	0B90	0001	MI SYSTEM OBJ BASE SEGMENT	12.5	301
			PF02 PF02	0B90	0001	MI SYSTEM OBJ BASE SEGMENT	12.0	289

Figure 114 (Part 1 of 4). Page Faults by Program and Object

Program	Program faults	% of SYS faults	Object name and type		Segment Type	Segment Type Description	% of program faults	# of Obj's Faults
QDBOPEN	2,403	6.0	PFO3	PFO3	0B90 0001	MI SYSTEM OBJ BASE SEGMENT	11.5	276
			PFO4	PFO4	0B90 0001	MI SYSTEM OBJ BASE SEGMENT	9.8	235
			DSPOBJD	DSPOBJD	0B90 0001	MI SYSTEM OBJ BASE SEGMENT	8.6	207
			PFO5	PFO5	0B90 0001	MI SYSTEM OBJ BASE SEGMENT	7.7	185
			SQCCSID1		0ED2 0001	MI SYSTEM OBJ BASE SEGMENT	3.1	74
			OPEN5		0201 0001	MI SYSTEM OBJ BASE SEGMENT	3.0	71
			TESTIO		0201 0001	MI SYSTEM OBJ BASE SEGMENT	2.3	56
			JUNK	QSPLJOB	1AEF 007D	SYSTEM-DOMAIN PROCESS SEG	1.4	34
			QDBOPEN		0201 0001	MI SYSTEM OBJ BASE SEGMENT	1.1	27
			QTMPLPRC		0201 0001	MI SYSTEM OBJ BASE SEGMENT	1.0	25
QDMCOPEN	2,268	5.6					100.0	2,268
			DSPOBJD		1901 0001	MI SYSTEM OBJ BASE SEGMENT	17.0	385
			PFO2		1901 0001	MI SYSTEM OBJ BASE SEGMENT	13.6	308
			PFO1		1901 0001	MI SYSTEM OBJ BASE SEGMENT	13.6	308
			PFO5		1901 0001	MI SYSTEM OBJ BASE SEGMENT	13.5	306
			PFO4		1901 0001	MI SYSTEM OBJ BASE SEGMENT	13.4	305
			PFO3		1901 0001	MI SYSTEM OBJ BASE SEGMENT	13.4	304
			D2FB76C7720O		0000 20D6	HEAP DATA SEGMENT TYPE	4.5	101

Program	Program faults	% of SYS faults	Object name and type		Segment Type	Segment Type Description	% of program faults	# of Obj's Faults
QDMCOPEN	2,268	5.6	QSOSRV2		0203 0001	MI SYSTEM OBJ BASE SEGMENT	3.5	80
			JUNK	QSPLJOB	1AEF 007D	SYSTEM-DOMAIN PROCESS SEG	1.5	35
			QUSRSYS		0401 0001	MI SYSTEM OBJ BASE SEGMENT	1.3	30
			QSECOFR		0801 0001	MI SYSTEM OBJ BASE SEGMENT	1.2	28
			OPENBAD	A960126A	1AEF 007C	USER-DOMAIN PROCESS SEG	1.0	22
OPEN5	2,215	5.5					100.0	2,215
			*DESTROYED		0000 0000		19.8	438
			OPENBAD	A960126A	1AEF 007C	USER-DOMAIN PROCESS SEG	5.4	119
*NONE	1,843	4.6					100.0	1,843
			FCFA2O24DAOO		0000 20D6	HEAP DATA SEGMENT TYPE	30.8	567
			OPENBAD	A960126A	1AEF 007C	USER-DOMAIN PROCESS SEG	11.8	218
			D2FB76C7720O		0000 20D6	HEAP DATA SEGMENT TYPE	7.0	129
			ILEAGNEW	A960126A	1AEF 007C	USER-DOMAIN PROCESS SEG	4.9	91
			JUNK	QSPLJOB	1AEF 007D	SYSTEM-DOMAIN PROCESS SEG	4.1	75
					007D	SYSTEM-DOMAIN PROCESS SEG	2.3	42
					007D	SYSTEM-DOMAIN PROCESS SEG	2.1	38
			QSOSRV2		0203 0001	MI SYSTEM OBJ BASE SEGMENT	2.0	36
			JUNK	QSPLJOB	1AEF 007D	SYSTEM-DOMAIN PROCESS SEG	2.0	36
			SM PERM DIR SEGMENT		0000 0000		1.8	33

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Program	Program faults	% of SYS faults	Object name and type		Segment Type	Segment Type Description	% of program faults	# of Obj's Faults
*NONE	1,843	4.6	OPEN5		0201 0001	MI SYSTEM OBJ BASE SEGMENT	1.8	33
			JUNK	QSPLJOB	1AEF 007D	SYSTEM-DOMAIN PROCESS SEG	1.5	27
			QTQSRVP2		0203 0001	MI SYSTEM OBJ BASE SEGMENT	1.3	24
			ILEAGNEW	A960126A	1AEF 007C	USER-DOMAIN PROCESS SEG	1.1	21
QLEAWI	1,742	4.3					100.0	1,742
			QLEAWI		0203 0001	MI SYSTEM OBJ BASE SEGMENT	48.0	837
			D7A7822472OO		0000 20BB	MODUL2 STATIC STORE	16.0	278
			FCFA2O24DAOO		0000 20D6	HEAP DATA SEGMENT TYPE	14.9	259
			OPENBAD	A960126A	1AEF 007C	USER-DOMAIN PROCESS SEG	7.2	126
			ILEAGNEW	A960126A	1AEF 007C	USER-DOMAIN PROCESS SEG	1.9	33
QDMCLOSE	1,147	2.9					100.0	1,147
			*DESTROYED		0000 0000		40.2	461
			PFO1	PFO1	0B90 0001	MI SYSTEM OBJ BASE SEGMENT	13.3	152
			PFO2	PFO2	0B90 0001	MI SYSTEM OBJ BASE SEGMENT	12.6	145
			SEIZE LOCK RANGE		0000 2081	HOLD RECORD SEG	10.7	123
			PFO3	PFO3	0B90 0001	MI SYSTEM OBJ BASE SEGMENT	10.7	123
			PFO4	PFO4	0B90 0001	MI SYSTEM OBJ BASE SEGMENT	5.8	67
			DSPOBJD	DSPOBJD	0B90 0001	MI SYSTEM OBJ BASE SEGMENT	3.2	37

Figure 114 (Part 2 of 4). Page Faults by Program and Object

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Program	Program faults	% of SYS faults	Object name and type		Segment Type	Segment Type Description	% of program faults	# of Obj's Faults
QDMCLOSE	1,147	2.9	PF05	PF05	0B90 0001	MI SYSTEM OBJ BASE SEGMENT	1.2	14
			QATOCTCPIPCONFIG		0C90 0001	MI SYSTEM OBJ BASE SEGMENT	1.0	12
			QATOCTCPIPCONFIG		0B90 0001	MI SYSTEM OBJ BASE SEGMENT	1.0	12
TESTIOC	982	2.4					100.0	982
			QRNXIE		0203 0001	MI SYSTEM OBJ BASE SEGMENT	11.4	112
TESTIO	932	2.3					100.0	932
QCATRS	864	2.1					100.0	864
			D2FB76C7720O		0000 20D6	HEAP DATA SEGMENT TYPE	38.2	330
			QYPPRT		0203 0001	MI SYSTEM OBJ BASE SEGMENT	5.6	48
			QPOLLIB1		0203 0001	MI SYSTEM OBJ BASE SEGMENT	5.2	45
			QSOSRV2		0203 0001	MI SYSTEM OBJ BASE SEGMENT	4.9	42
			QTMPLPRC		0201 0001	MI SYSTEM OBJ BASE SEGMENT	4.5	39
			QSOSRV1		0203 0001	MI SYSTEM OBJ BASE SEGMENT	4.4	38
			QTQICONV		0203 0001	MI SYSTEM OBJ BASE SEGMENT	3.9	34
			QPOSSRV3		0203 0001	MI SYSTEM OBJ BASE SEGMENT	3.8	33
			QWPZHPT1		0203 0001	MI SYSTEM OBJ BASE SEGMENT	3.0	26
			QTQICVC2		0203 0001	MI SYSTEM OBJ BASE SEGMENT	3.0	26
			QPOWPIDI		0203 0001	MI SYSTEM OBJ BASE SEGMENT	3.0	26

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Program	Program faults	% of SYS faults	Object name and type		Segment Type	Segment Type Description	% of program faults	# of Obj's Faults
QCATRS	864	2.1	QPOWPID		0203 0001	MI SYSTEM OBJ BASE SEGMENT	3.0	26
			QPOSSRV4		0203 0001	MI SYSTEM OBJ BASE SEGMENT	3.0	26
			QPOLDC1		0203 0001	MI SYSTEM OBJ BASE SEGMENT	3.0	26
			F836A3DBEA0O		0000 20AC	MWS AREA DATA SID	3.0	26
			JUNK	QSPLJOB	1AEF 007D	SYSTEM-DOMAIN PROCESS SEG	1.9	16
			QTMPCKP		0201 0001	MI SYSTEM OBJ BASE SEGMENT	1.6	14
			QTCP		0401 0001	MI SYSTEM OBJ BASE SEGMENT	1.6	14
			D1EDE9BC470O		0000 20AC	MWS AREA DATA SID	1.5	13
			QJOBMSGQ		18A0 0001	MI SYSTEM OBJ BASE SEGMENT	1.4	12
QDMRCLSE	861	2.1					100.0	861
			QSQENDAG		0201 0001	MI SYSTEM OBJ BASE SEGMENT	64.6	556
			ILEAGNEW	A960126A	1AEF 0006	IWA	29.3	252
			FCFA2O24DA0O		0000 20D6	HEAP DATA SEGMENT TYPE	5.7	49
OPENBAD	840	2.1					100.0	840
			QCAWAREA		19EF 0001	MI SYSTEM OBJ BASE SEGMENT	37.5	315
			OPENBAD		0201 0001	MI SYSTEM OBJ BASE SEGMENT	6.1	51
					0001	MI SYSTEM OBJ BASE SEGMENT	6.0	50
					0001	MI SYSTEM OBJ BASE SEGMENT	6.0	50
					0001	MI SYSTEM OBJ BASE SEGMENT	6.0	50
					0001	MI SYSTEM OBJ BASE SEGMENT	5.8	49

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Program	Program faults	% of SYS faults	Object name and type		Segment Type	Segment Type Description	% of program faults	# of Obj's Faults
OPENBAD	840	2.1	OPENBAD	A960126A	1AEF 007B	SLIC ADDR PROCESS SEG	4.9	41
					007B	SLIC ADDR PROCESS SEG	4.6	39
					007B	SLIC ADDR PROCESS SEG	4.0	34
			OPENBAD		0201 0001	MI SYSTEM OBJ BASE SEGMENT	4.0	34
			OPEN5		0201 0001	MI SYSTEM OBJ BASE SEGMENT	3.2	27
			OPENBAD	A960126A	1AEF 007B	SLIC ADDR PROCESS SEG	2.6	22
			OPENBAD		0201 0001	MI SYSTEM OBJ BASE SEGMENT	2.4	20
					0001	MI SYSTEM OBJ BASE SEGMENT	1.1	9
			OPENBAD	A960126A	1AEF 007B	SLIC ADDR PROCESS SEG	1.0	8
QSOKERN3	710	1.8					100.0	710
			L/L RANGE 1		0000 0000		23.1	164
			E43BF962E50O		0000 20AC	MWS AREA DATA SID	9.7	69
			QSO_DNS_INDEX		0EEF 0001	MI SYSTEM OBJ BASE SEGMENT	8.5	60
			QPOLLFS1		0203 0001	MI SYSTEM OBJ BASE SEGMENT	4.2	30
			ECB9E6FE0E0O		0000 20DF	MUTEX TEMP SEGMENT	3.7	26
			QTMPLPRC		0201 0001	MI SYSTEM OBJ BASE SEGMENT	3.0	21
			QSOKERN3		0203 0001	MI SYSTEM OBJ BASE SEGMENT	2.7	19
					0001	MI SYSTEM OBJ BASE SEGMENT	2.7	19
					0001	MI SYSTEM OBJ BASE SEGMENT	2.7	19
					0001	MI SYSTEM OBJ BASE SEGMENT	2.7	19
					0001	MI SYSTEM OBJ BASE SEGMENT	2.5	18
			JUNK	QSPLJOB	1AEF 007D	SYSTEM-DOMAIN PROCESS SEG	2.4	17

Figure 114 (Part 3 of 4). Page Faults by Program and Object

```
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Program       Program  % of SYS  Object name                Segment  Segment Type                          % of     # of Obj's
              faults   faults    and type                   Type     Description                           program  Faults
                                                                                                            faults
QSOKERN3          710      1.8   QSOKERN3             0203  0001     MI SYSTEM OBJ BASE SEGMENT              2.1          15
                                 QSECOFR              0801  0001     MI SYSTEM OBJ BASE SEGMENT              2.1          15
                                 D2FB76C7720O         0000  20D6     HEAP DATA SEGMENT TYPE                  2.1          15
                                 FCAE14909A0O         0000  20AB     MWS AREA CTL SID                        2.0          14
                                 EEE05252CB0O         0000  20BB     MODUL2 STATIC STORE                     2.0          14
                                 QSOSRV2              0203  0001     MI SYSTEM OBJ BASE SEGMENT              1.4          10
                                                            0001     MI SYSTEM OBJ BASE SEGMENT              1.3           9
                                                            0001     MI SYSTEM OBJ BASE SEGMENT              1.1           8
                                                            0001     MI SYSTEM OBJ BASE SEGMENT              1.1           8
                                                            0001     MI SYSTEM OBJ BASE SEGMENT              1.1           8
ILEAGN            509      1.3                                                                             100.0         509
                                 ILEAGN               0201  0022     CONSTANT SPACE SEGMENT                 35.2         179
                                                            0022     CONSTANT SPACE SEGMENT                 15.9          81
                                 ILEAGNEW  A960126A   1AEF  007C     USER-DOMAIN PROCESS SEG                 9.4          48
                                                            007C     USER-DOMAIN PROCESS SEG                 8.6          44
                                                            007C     USER-DOMAIN PROCESS SEG                 7.9          40
                                                            007C     USER-DOMAIN PROCESS SEG                 7.1          36
                                                            007C     USER-DOMAIN PROCESS SEG                 4.5          23
                                                            007C     USER-DOMAIN PROCESS SEG                 3.9          20
                                 ILEAGN               0201  0022     CONSTANT SPACE SEGMENT                  3.5          18
                                 FCFA2024DA0O         0000  20D6     HEAP DATA SEGMENT TYPE                  2.6          13
QRNXIO            464      1.2                                                                             100.0         464
                                 *DESTROYED           0000  0000                                             69.2         321


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Program       Program  % of SYS  Object name                Segment  Segment Type                          % of     # of Obj's
              faults   faults    and type                   Type     Description                           program  Faults
                                                                                                            faults
QRNXIO            464      1.2   OPENBAD   A960126A   1AEF  007C     USER-DOMAIN PROCESS SEG                30.8         143
* * *  E N D  O F  R E P O R T  * * *
```

Figure 114 (Part 4 of 4). Page Faults by Program and Object

10.4.11 Report Title - Faults by Program and Low-level SLIC Program

This report is produced from Command Option - By MI PGM.

```
Faults by program and low-level SLIC (micro-code) program.
Includes only programs with 1% or more of system faults and
SLIC programs with 1% or more of the selected programs' faults
      QUERY NAME . . . . . FLTMISLIC5
      LIBRARY NAME . . . . SMTRACE
      FILE         LIBRARY      MEMBER       FORMAT
      FLTMISLIC4   PFREXP2      PEXTRACE     FLTMISLIC4
      FLTMISLIC1   PFREXP2      PEXTRACE     FLTMISLIC1
      DATE . . . . . 08/02/96
      TIME . . . . . 19:03:28


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Program         Fault  Percent  SLIC       SLIC pgm  SLIC pgm %
                count  program  program    fault     of program
                       faults              count
ILEAGNEW        6,503    16.2   #ailesu       1,588      24.4
                                #aiaa           839      12.9
                                #airpi          695      10.7
                                *NONE           560       8.6
                                #airseol        527       8.1
                                #aicapgm        482       7.4
                                PmAttrib        281       4.3
                                #hmfrehs        277       4.3
                                #aidag          258       4.0
                                #cfressp        199       3.1
                                #aiaps          190       2.9
                                #aiabp          187       2.9
                                #aiisf2          82       1.3
                                SmUpdate         62       1.0
QCLCLCPR        6,218    15.5   *NONE         2,540      40.8
                                IxRadix3      1,255      20.2
                                VBNVRMCF        751      12.1
                                #mndgpck        472       7.6
                                #domtsob        422       6.8
                                RmslHold        272       4.4
                                VBNSERV2        196       3.2
                                #mnressp        111       1.8
                                RmslInte        111       1.8
QDBGETM         3,429     8.5   #dbrsqmn      1,322      38.6
                                *NONE         1,191      34.7
                                #dbreseq        727      21.2
                                RmslHold        108       3.1
                                #dbbring         64       1.9
QSQENDAG        3,255     8.1   #aisfiag      1,846      56.7
                                *NONE           278       8.5
                                ExIntHan        275       8.4
                                ExFanOut        273       8.4
                                VOXEXRUN        258       7.9
```

Figure 115 (Part 1 of 3). Faults by Program and Low-level SLIC Program

```
08/02/96  19:03:28                                          PAGE    2
Program         Fault  Percent  SLIC       SLIC pgm  SLIC pgm %
                count  program  program    fault     of program
                       faults              count
QSQENDAG        3,255     8.1   bzero_Co       138       4.2
                                QsHdrMM        138       4.2
QDBOPEN         2,403     6.0   RmslInte     1,504      62.6
                                RmslHold       543      22.6
                                VBNTBSCH       109       4.5
                                *NONE           70       2.9
                                IxRadix3        50       2.1
                                ExGetMod        44       1.8
                                #dbacr          41       1.7
                                #cfochkr        24       1.0
QDMCOPEN        2,268     5.6   #mndgpck     1,922      84.7
                                VBNTBSCH        99       4.4
                                #aimagpa        68       3.0
                                *NONE           62       2.7
                                IxRadix3        32       1.4
                                #domtivf        31       1.4
                                #cfauth         28       1.2
OPEN5           2,215     5.5   *NONE        1,771      80.0
                                #aidactv       444      20.0
*NONE           1,843     4.6   *NONE        1,723      93.5
                                IxRadix3        33       1.8
                                SmAccess        27       1.5
                                SmSegmen        19       1.0
QLEAWI          1,742     4.3   #domtptr       558      32.0
                                VBNTBSCH       558      32.0
                                *NONE          323      18.5
                                #aitmbst       166       9.5
                                #aifpa          86       4.9
                                #exsndpm        40       2.3
QDMCLOSE        1,147     2.9   #domodso       545      47.5
                                     M05


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Program         Fault  Percent  SLIC       SLIC pgm  SLIC pgm %
                count  program  program    fault     of program
                       faults              count
QDMCLOSE        1,147     2.9   #cfochkr       261      22.8
                                #dbxdacr       202      17.6
                                RmslHold       119      10.4
                                #dbixuse        12       1.0
TESTIOC           982     2.4   *NONE          863      87.9
                                #mndgpck       112      11.4
TESTIO            932     2.3   *NONE          726      77.9
                                #aidactv       206      22.1
QCATRS            864     2.1   #airpi         199      23.0
                                #mndgpck        98      11.3
                                #aiaa           87      10.1
                                #aiisp          85       9.8
                                #cfressp        85       9.8
                                #aiaps          73       8.4
                                #aiabp          50       5.8
                                #aiisf1         26       3.0
                                HmDerive        26       3.0
                                #hmalchs        21       2.4
                                #mnressp        15       1.7
                                #aigpa          14       1.6
                                IxRadix3        14       1.6
                                qugate_l        13       1.5
                                QsHdrPub        12       1.4
                                #aiisf2          9       1.0
                                #aimxpre         9       1.0
QDMRCLSE          861     2.1   #aicapgm       605      70.3
                                #pdcscvr       252      29.3
OPENBAD           840     2.1   *NONE          646      76.9
                                #hmfrehs       167      19.9
                                #ailesu         19       2.3
                                #aidpa           8       1.0
```

Figure 115 (Part 2 of 3). Faults by Program and Low-level SLIC Program

```
08/02/96  19:03:28                                        PAGE    4
Program         Fault  Percent  SLIC       SLIC pgm  SLIC pgm %
                count  program  program    fault     of program
                       faults              count
QSOKERN3          710      1.8  #asmpuwp        148       20.8
                                *NONE           129       18.2
                                VBNTBSCH        117       16.5
                                #domtivf         99       13.9
                                IxRadix3         48        6.8
                                HmDerive         36        5.1
                                #asmptn          18        2.5
                                #skverb          18        2.5
                                PxspDLLi         18        2.5
                                vlosockm         13        1.8
                                #cfochkr         12        1.7
                                #aitmbst         11        1.5
                                QuLinked         11        1.5
                                #tomckp           9        1.3
                                qugate_l          9        1.3
ILEAGN            509      1.3  *NONE           428       84.1
                                #aicpp           72       14.1
QRNXIO            464      1.2  *NONE           464      100.0
     FINAL TOTALS
* * *  E N D  O F  R E P O R T  * * *
```

Figure 115 (Part 3 of 3). Faults by Program and Low-level SLIC Program

10.4.12 Report Title - Page Fault by Program and Job/Task Within Program

This report is produced from Command Option - By MI PGM.

```
                    Page faults by Program and Job/Task within Program.
                    Includes only Programs with 1% or more of system faults.
                    Includes only Jobs/Tasks with 1% or more of the Prrogram's faults.
                          QUERY NAME . . . . . FLTMITDE5
                          LIBRARY NAME . . . . SMTRACE
                          FILE         LIBRARY      MEMBER       FORMAT
                          FLTMITDE4    PFREXP2      PEXTRACE     FLTMIDE4
                          FLTMITDE1    PFREXP2      PEXTRACE     FLTMIDE1
                          TASKINFO     PFREXP2      PEXTRACE     TASKINFO
                          DATE . . . . . 08/02/96
                          TIME . . . . . 19:03:28

                                                  MO5
Program     TDE       Job/Task name     Job     Job           Num of    Percent     Percent
            number                      number  user          faults    of Sys      of pgm
            (hex)                                                       faults      faults
ILEAGNEW    0000880E  ILEAGNEW          053541  A960126A       6,503      16.2       100.0
                                                     TOTAL     6,503      16.2       100.0
QCLCLCPR    00008810  TSTIOC            053543  A960126A       2,952       7.3        47.5
            00008814  OPENBAD           053546  A960126A       1,823       4.5        29.3
            0000880E  ILEAGNEW          053541  A960126A       1,442       3.6        23.2
                                                     TOTAL     6,217      15.4       100.0
QDBGETM     00008810  TSTIOC            053543  A960126A       1,751       4.4        51.1
            00008814  OPENBAD           053546  A960126A       1,678       4.2        48.9
                                                     TOTAL     3,429       8.6       100.0
QSQENDAG    0000880E  ILEAGNEW          053541  A960126A       3,219       8.0        98.9
            00008408  JUNK              053464  QSPLJOB           36        .1         1.1
                                                     TOTAL     3,255       8.1       100.0
QDBOPEN     00008814  OPENBAD           053546  A960126A       1,887       4.7        78.5
            00008810  TSTIOC            053543  A960126A         266        .7        11.1
            00008408  JUNK              053464  QSPLJOB          250        .6        10.4
                                                     TOTAL     2,403       6.0       100.0
QDMCOPEN    00008814  OPENBAD           053546  A960126A       1,558       3.9        68.7
            00008810  TSTIOC            053543  A960126A         386       1.0        17.0
            00008408  JUNK              053464  QSPLJOB          319        .8        14.1
                                                     TOTAL     2,263       5.7        99.8
OPEN5       00008814  OPENBAD           053546  A960126A       2,215       5.5       100.0
                                                     TOTAL     2,215       5.5       100.0
*NONE       0000880E  ILEAGNEW          053541  A960126A         867       2.2        47.0
            00008408  JUNK              053464  QSPLJOB          603       1.5        32.7
            00008814  OPENBAD           053546  A960126A         306        .8        16.6
            0000881E  PEXTRACE          053555  A960126A          19        .0         1.0
                                                     TOTAL     1,795       4.5        97.3
QLEAWI      0000880E  ILEAGNEW          053541  A960126A       1,590       4.0        91.3
            00008814  OPENBAD           053546  A960126A         126        .3         7.2
            00008408  JUNK              053464  QSPLJOB           26        .1         1.5
                                                     TOTAL     1,742       4.4       100.0
QDMCLOSE    00008814  OPENBAD           053546  A960126A       1,066       2.7        92.9
            00008810  TSTIOC            053543  A960126A          57        .1         5.0
                                                  MO5
```

Figure 116 (Part 1 of 2). Faults by Program and Job/Task Within Program

```
Program     TDE       Job/Task name     Job     Job           Num of    Percent     Percent
            number                      number  user          faults    of Sys      of pgm
            (hex)                                                       faults      faults
QDMCLOSE    00008408  JUNK              053464  QSPLJOB           24        .1         2.1
                                                      TOTAL    1,147       2.9       100.0
TESTIOC     00008810  TSTIOC            053543  A960126A         982       2.4       100.0
                                                      TOTAL      982       2.4       100.0
TESTIO      00008810  TSTIOC            053543  A960126A         932       2.3       100.0
                                                      TOTAL      932       2.3       100.0
QCATRS      00008408  JUNK              053464  QSPLJOB          860       2.1        99.5
                                                      TOTAL      860       2.1        99.5
QDMRCLSE    0000880E  ILEAGNEW          053541  A960126A         855       2.1        99.3
                                                      TOTAL      855       2.1        99.3
OPENBAD     00008814  OPENBAD           053546  A960126A         840       2.1       100.0
                                                      TOTAL      840       2.1       100.0
QSOKERN3    00008408  JUNK              053464  QSPLJOB          710       1.8       100.0
                                                      TOTAL      710       1.8       100.0
ILEAGN      0000880E  ILEAGNEW          053541  A960126A         509       1.3       100.0
                                                      TOTAL      509       1.3       100.0
QRNXIO      00008814  OPENBAD           053546  A960126A         462       1.1        99.6
                                                      TOTAL      462       1.1        99.6
                                                      0

 * * *  E N D  O F  R E P O R T  * * *
                                                    MO5
```

Figure 116 (Part 2 of 2). Faults by Program and Job/Task Within Program

10.4.13 Report Title - Faults by SLIC Program that are >=1% of Total System Faults

This report is produced from Command Option - By MI PGM.

```
                    Faults by SLIC PGM that are
                    >= %1.0 of Total System Faults
                QUERY NAME . . . . . FLTSLICA2
                LIBRARY NAME . . . . SMTRACE
                FILE         LIBRARY      MEMBER       FORMAT
                FLTSLICA     PFREXP2      PEXTRACE     FLTSLICA
                FLTSLICA1    PFREXP2      PEXTRACE     FLTSLICA1
                DATE . . . . . . . . 08/02/96
                TIME . . . . . . . . 19:03:50


08/02/96  19:03:50     PAGE    1
SLIC PGM  % of System     Total
          faults          Faults
             100.0        40,205
*NONE         33.6        13,513
#mndgpck       6.6         2,658
#aisfiag       4.6         1,857
#ailesu        4.3         1,739
RmslInte       4.1         1,639
IxRadix3       3.9         1,563
#dbrsqmn       3.3         1,322
#aicapgm       2.9         1,164
RmslHold       2.7         1,069
#aiaa          2.3           926
VBNTBSCH       2.3           922
#airpi         2.2           894
VBNVRMCF       1.9           751
#dbreseq       1.8           727
#aidactv       1.6           650
#domtptr       1.4           572
#domodso       1.4           545
#airseol       1.3           534
                                                  MO5


08/02/96  19:03:50     PAGE    2
SLIC PGM  % of System     Total
          faults          Faults
#hmfrehs       1.1           444
#domtsob       1.1           423
* * *  E N D  O F  R E P O R T  * * *
```

Figure 117. Faults by SLIC Program that are .=1% of Total System Faults

10.5 Disk Space Consumption - Net Size Change from PEX Run (NETSIZE Command)

This section provides an example of every report you can produce using this command.

Please refer to section 6.6.5, “NETSIZE Reporting Command” on page 157 for a details of how to use the NETSIZE command to produce these reports.

Refer to table Table 13 on page 168 for details of the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

10.5.1 Report Title - Net Size Change (in Bytes) of Individual Segments

This report is produced from Command Option - Both TEMPs and PERMs?

```
Net size change (in bytes) of individual segments.
(total size change at bottom of report)
QUERY NAME . . . . . NETSIDRPT
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
NETSIDOBJ2   PFREXP2      PEXTRACE     NETSIDOBJ2
DATE . . . . . 08/02/96
TIME . . . . . 19:05:11
```

Net size change (in bytes)	Object/segment address	SID type	Object/segment name	Object type	Segment type	Description
131,072	F18D42DC9300	T	PAG	01EF	0007	TEMPORARY - ACCESS GROUP
98,304	CD3A85130500	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
73,728	E114192F4C00	T	QWCCDSACORDERINDEX	0EEF	0001	TEMPORARY - INDEX
65,536	DB095007C004	T	*DESTROYED	0000	0000	
65,536	E22B02E31004	T	*DESTROYED	0000	0000	
40,960	ECCE531C0A00	T	QWCCDSACJOBINDEX	0EEF	0001	TEMPORARY - INDEX
32,768	C3E43389E600	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
24,576	EFAC0C01FF00	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
16,384	EB72185C3100	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
16,384	FA6CF93A2F00	T	A960126A	0EC4	0001	INTERACTIVE PROFILE
16,384	315B69CF2300	P	QJOBMSGQ	18A0	0001	JOB MESSAGE QUEUE
12,288	E5ACA040BA00	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
12,288	1579A708B100	DP	PF132 PEXTRACSTS	0B90	0003	COMPOSITE PIECE - DATA SPACE
12,288	C3E62C036004	T	C3E62C036004	0000	20D9	TOMBSTONE SEGMENT
8,192	C20421F82A00	T	QCAWAREA	19EF	0001	TEMPORARY - SPACE
8,192	C258AF143D00	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
8,192	DAFA13F7C200	T	QCAWAREA	19FC	0001	PROTECTED SPACE
8,192	DC564EB79B00	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
8,192	EA15DD9C5800	T	QCAWAREA	19EF	0001	TEMPORARY - SPACE
8,192	EFDB55B7CF00	T	QCAWAREA	19FC	0001	PROTECTED SPACE
8,192	FCA197E7FE00	T	QCAWAREA	19FC	0001	PROTECTED SPACE
8,192	FCC280AE9600	T	WMHQ Data Queue Cach	19EF	0001	TEMPORARY - SPACE
8,192	FEF71F5C6500	T	QCAWAREA	19EF	0001	TEMPORARY - SPACE
8,192	F1379077A800	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
8,192	F2E8585394 00	T	QCAWAREA	19FC	0001	PROTECTED SPACE
8,192	CBBD618C9400	T	*DESTROYED	0000	0000	
8,192	C5F7E9711D00	T	*DESTROYED	0000	0000	
8,192	DC3565F10300	T	*DESTROYED	0000	0000	
8,192	D2AF210B2004	DT	D2AF210B2004	0000	20B1	DATA SPACE RUN TIME SID
8,192	ED85CE436800	T	*DESTROYED	0000	0000	
8,192	EE32788FC300	T	EE32788FC300	0000	20D6	HEAP DATA SEGMENT TYPE
8,192	E42F7CBA4900	T	*DESTROYED	0000	0000	
8,192	F34B465EDF00	T	*DESTROYED	0000	0000	
4,096	CB5A7381490 0	T	QCAPLIST	19FC	0001	PROTECTED SPACE
4,096	C287F8CA0D00	T	QCAPLIST	19EF	0001	TEMPORARY - SPACE
4,096	C81E272FB400	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
4,096	C84D70E58400	T	QCAPLIST	19FC	0001	PROTECTED SPACE
4,096	DA763D25DF00	T	QCAPLIST	19EF	0001	TEMPORARY - SPACE

Figure 118 (Part 1 of 2). Net Size Change (in Bytes) of Individual Segments

```
                  Net size     Object/segment  SID   Object/segment        Object  Segment  Description
                  change       address         type  name                  type    type
                  (in bytes)
                       4,096    DOCB5E8OADOO     T   DOCB5E8OADOO           19EF    0001    TEMPORARY - SPACE
                       4,096    D513B315B3OO     T   QCAPLIST               19FC    0001    PROTECTED SPACE
                       4,096    D7693A8A1AOO     T   QCAPLIST               19EF    0001    TEMPORARY - SPACE
                       4,096    E1FADEOC7AOO     T   A960126A               OEC4    0002    INTERACTIVE PROFILE
                       4,096    E93D79AE62OO     T   QMAIR                  19EF    0001    TEMPORARY - SPACE
                       4,096    FE1EBB6E6FOO     T   UIM_TEMPORARY_WORKSP   19EF    0001    TEMPORARY - SPACE
                       4,096    F36C2F2577OO     T   QCAPLIST               19FC    0001    PROTECTED SPACE
                       4,096    F8594352F8OO     T   UIM_TEMPORARY_WORKSP   19EF    0001    TEMPORARY - SPACE
                       4,096    2DEBC2366600    DP   PF132     PEXTRACSTS   0B90    0001    COMPOSITE PIECE - DATA SPACE
                       4,096    232D272FB9OO     P   QSPSCB                 19C2    0001    SPOOL CTL BLOCK
                       4,096    3DO78BDAFCOO     P   PF132     PEXTRACSTS   0D50    0001    DATA BASE FILE MEMBER
                       4,096    CA4A7FFD57OO     T   CA4A7FFD57OO           0000    20AB    MWS AREA CTL SID
                       4,096    E7CB3ED36004     T   E7CB3ED36004           0000    20D9    TOMBSTONE SEGMENT
                       4,096    F4A7811EB8OO     T   *DESTROYED             0000    0000
                       4,096-   C0D730EE21OO     T   *DESTROYED             0000    0000
                       8,192-   E86515C06COO     T   *DESTROYED             0000    0000
                      16,384-   C1AF94DC17OO     T   *DESTROYED             0000    0000
FINAL TOTALS
TOTAL                823,296
* * *  E N D  O F  R E P O R T  * * *
```

Figure 118 (Part 2 of 2). Net Size Change (in Bytes) of Individual Segments

10.5.2 Report Title - Net Size Change, Grouped by (Name, Object Type, Segment Type)

This report is produced from Command Option - Both TEMPs and PERMs?

```
                  Net size change, grouped by (name, obj-type, seg-type).
                  (total net change at bottom of report)
                     QUERY NAME . . . . . NETOBJRPT2
                     LIBRARY NAME . . . . SMTRACE
                     FILE         LIBRARY      MEMBER       FORMAT
                     NETOBJRPT1   PFREXP2      PEXTRACE     NETOBJRPT1
                     DATE . . . . . . . . 08/02/96
                     TIME . . . . . . . . 19:05:12


                Net size   Object/Segment                 Description
                change     name,
                (bytes)    obj type, seg type
                 221,184   UIM_TEMPORARY_WORKSP 19EF 0001  TEMPORARY - SPACE
                 155,648   *DESTROYED           0000 0000
                 131,072   PAG                  01EF 0007  TEMPORARY - ACCESS GROUP
                  73,728   QWCCDSACORDERINDEX   0EEF 0001  TEMPORARY - INDEX
                  40,960   QWCCDSACJOBINDEX     0EEF 0001  TEMPORARY - INDEX
                  32,768   QCAWAREA             19FC 0001  PROTECTED SPACE
                  24,576   QCAWAREA             19EF 0001  TEMPORARY - SPACE
                  16,384   QJOBMSGQ             18A0 0001  JOB MESSAGE QUEUE
                  16,384   QCAPLIST             19FC 0001  PROTECTED SPACE
                  16,384   A960126A             0EC4 0001  INTERACTIVE PROFILE
                  12,288   QCAPLIST             19EF 0001  TEMPORARY - SPACE
                  12,288   PF132     PEXTRACSTS 0B90 0003  COMPOSITE PIECE - DATA SPACE
                  12,288   C3E62C036004         0000 20D9  TOMBSTONE SEGMENT
                   8,192   WMHQ Data Queue Cach 19EF 0001  TEMPORARY - SPACE
                   8,192   EE32788FC300         0000 20D6  HEAP DATA SEGMENT TYPE
                   8,192   D2AF210B2004         0000 20B1  DATA SPACE RUN TIME SID
                   4,096   QSPSCB               19C2 0001  SPOOL CTL BLOCK
                   4,096   QMAIR                19EF 0001  TEMPORARY - SPACE
                   4,096   PF132     PEXTRACSTS 0D50 0001  DATA BASE FILE MEMBER
                   4,096   PF132     PEXTRACSTS 0B90 0001  COMPOSITE PIECE - DATA SPACE
                   4,096   E7CB3ED36004         0000 20D9  TOMBSTONE SEGMENT
                   4,096   D0CB5E80AD00         19EF 0001  TEMPORARY - SPACE
                   4,096   CA4A7FFD5700         0000 20AB  MWS AREA CTL SID
                   4,096   A960126A             0EC4 0002  INTERACTIVE PROFILE
FINAL TOTALS
TOTAL                823,296
* * *  E N D  O F  R E P O R T  * * *
```

Figure 119. Net Size Change, Grouped by Name/Object-Type/Segment-Type

10.5.3 Report Title - Net Size Change, Grouped by Object/Segment Description

This report is produced from Command Option - Both TEMPs and PERMs?

```
                              Net size change, grouped by Object/Segment description.
                              Destroyed and unknown types group under a blank description.
                              Total net size change at bottom of report.
                                   QUERY NAME . . . . . NETDSCRPT2
                                   LIBRARY NAME . . . . SMTRACE
                                   FILE         LIBRARY      MEMBER       FORMAT
                                   NETDSCRPT1   PFREXP2      PEXTRACE     NETDSCRPT1
                                   DATE . . . . . . . . 08/02/96
                                   TIME . . . . . . . . 19:05:13

08/02/96  19:05:13                                          PAGE    1
                Net size change   Description
                (bytes)
                        274,432   TEMPORARY - SPACE
                        155,648
                        131,072   TEMPORARY - ACCESS GROUP
                        114,688   TEMPORARY - INDEX
                         49,152   PROTECTED SPACE
                         20,480   INTERACTIVE PROFILE
                         16,384   COMPOSITE PIECE - DATA SPACE
                         16,384   JOB MESSAGE QUEUE
                         16,384   TOMBSTONE SEGMENT
                          8,192   DATA SPACE RUN TIME SID
                          8,192   HEAP DATA SEGMENT TYPE
                          4,096   DATA BASE FILE MEMBER
                          4,096   MWS AREA CTL SID
                          4,096   SPOOL CTL BLOCK
FINAL TOTALS
TOTAL                   823,296
* * *  E N D  O F  R E P O R T  * * *
```

Figure 120. Net Size Change, Grouped by Object/Segment Description

10.5.4 Report Title - Net Size Change by Job or Task

This report is produced from Command Option - Both TEMPs and PERMs?

```
                                      Net size change by Job or Task.
                                   QUERY NAME . . . . . NETTDERPT2
                                   LIBRARY NAME . . . . SMTRACE
                                   FILE         LIBRARY      MEMBER       FORMAT
                                   NETTDERPT1   PFREXP2      PEXTRACE     NETTDERPT1
                                   TASKINFO     PFREXP2      PEXTRACE     TASKINFO
                                   DATE . . . . . . . . 08/02/96
                                   TIME . . . . . . . . 19:05:16


            Net size change   TDE       Job/Task name     Job         Job
            (bytes)           number                      user        number
                    360,448   0000881E  PEXTRACE          A960126A    053555
                    184,320   00007F6C  P23ARTVKE         A960126A    053319
                    118,784   0000880E  ILEAGNEW          A960126A    053541
                     69,632   00008408  JUNK              QSPLJOB     053464
                     65,536   00008814  OPENBAD           A960126A    053546
                     24,576   00008810  TSTIOC            A960126A    053543
FINAL TOTALS
TOTAL                823,296
* * *  E N D  O F  R E P O R T  * * *
```

Figure 121. Net Size Change by Job or Task

10.5.5 Report Title - Net Size Change (in Bytes) of Individual Segments

This report is produced from Command Option - TEMP Segment/Objects?

```
Net size change (in bytes) of individual segments.
(total size change at bottom of report)
QUERY NAME . . . . . NETSIDRPT
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
NETSIDOBJ2   PFREXP2      PEXTRACE     NETSIDOBJ2
DATE . . . . . 08/02/96
TIME . . . . . 19:05:19
```

Net size change (in bytes)	Object/segment address	SID type	Object/segment name	Object type	Segment type	Description
131,072	F18D42DC9300	T	PAG	01EF	0007	TEMPORARY - ACCESS GROUP
98,304	CD3A85130500	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
73,728	E114192F4C00	T	QWCCDSACORDERINDEX	0EEF	0001	TEMPORARY - INDEX
65,536	DB095007C004	T	*DESTROYED	0000	0000	
65,536	E22B02E31004	T	*DESTROYED	0000	0000	
40,960	ECCE531C0A00	T	QWCCDSACJOBINDEX	0EEF	0001	TEMPORARY - INDEX
32,768	C3E43389E600	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
24,576	EFAC0C01FF00	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
16,384	EB72185C3100	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
16,384	FA6CF93A2F00	T	A960126A	0EC4	0001	INTERACTIVE PROFILE
12,288	E5ACA040BA00	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
12,288	C3E62C036004	T	C3E62C036004	0000	20D9	TOMBSTONE SEGMENT
8,192	C20421F82A00	T	QCAWAREA	19EF	0001	TEMPORARY - SPACE
8,192	C258AF143D00	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
8,192	DAFA13F7C200	T	QCAWAREA	19FC	0001	PROTECTED SPACE
8,192	DC564EB79B00	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
8,192	EA15DD9C5800	T	QCAWAREA	19EF	0001	TEMPORARY - SPACE
8,192	EFDB55B7CF00	T	QCAWAREA	19FC	0001	PROTECTED SPACE
8,192	FCA197E7FE00	T	QCAWAREA	19FC	0001	PROTECTED SPACE
8,192	FCC280AE9600	T	WMHQ Data Queue Cach	19EF	0001	TEMPORARY - SPACE
8,192	FEF71F5C6500	T	QCAWAREA	19EF	0001	TEMPORARY - SPACE
8,192	F1379077A800	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
8,192	F2E858539400	T	QCAWAREA	19FC	0001	PROTECTED SPACE
8,192	CBBD618C9400	T	*DESTROYED	0000	0000	
8,192	C5F7E9711D00	T	*DESTROYED	0000	0000	
8,192	DC3565F10300	T	*DESTROYED	0000	0000	
8,192	D2AF210B2004	DT	D2AF210B2004	0000	20B1	DATA SPACE RUN TIME SID
8,192	ED85CE436800	T	*DESTROYED	0000	0000	
8,192	EE32788FC300	T	EE32788FC300	0000	20D6	HEAP DATA SEGMENT TYPE
8,192	E42F7CBA4900	T	*DESTROYED	0000	0000	
8,192	F34B465EDF00	T	*DESTROYED	0000	0000	
4,096	CB5A73814900	T	QCAPLIST	19FC	0001	PROTECTED SPACE
4,096	C287F8CA0D00	T	QCAPLIST	19EF	0001	TEMPORARY - SPACE
4,096	C81E272FB400	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
4,096	C84D70E58400	T	QCAPLIST	19FC	0001	PROTECTED SPACE
4,096	DA763D25DF00	T	QCAPLIST	19EF	0001	TEMPORARY - SPACE
4,096	D0CB5E80AD00	T	D0CB5E80AD00	19EF	0001	TEMPORARY - SPACE
4,096	D513B315B300	T	QCAPLIST	19FC	0001	PROTECTED SPACE

Figure 122 (Part 1 of 2). Net Size Change (in Bytes) of Individual Segments

Net size change (in bytes)	Object/segment address	SID type	Object/segment name	Object type	Segment type	Description
4,096	D7693A8A1A00	T	QCAPLIST	19EF	0001	TEMPORARY - SPACE
4,096	E1FADE0C7A00	T	A960126A	0EC4	0002	INTERACTIVE PROFILE
4,096	E93D79AE6200	T	QMAIR	19EF	0001	TEMPORARY - SPACE
4,096	FE1EBB6E6F00	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
4,096	F36C2F257700	T	QCAPLIST	19FC	0001	PROTECTED SPACE
4,096	F8594352F800	T	UIM_TEMPORARY_WORKSP	19EF	0001	TEMPORARY - SPACE
4,096	CA4A7FFD5700	T	CA4A7FFD5700	0000	20AB	MWS AREA CTL SID
4,096	E7CB3ED36004	T	E7CB3ED36004	0000	20D9	TOMBSTONE SEGMENT
4,096	F4A7811EB800	T	*DESTROYED	0000	0000	
4,096-	C0D730EE2100	T	*DESTROYED	0000	0000	
8,192-	E86515C06C00	T	*DESTROYED	0000	0000	
16,384-	C1AF94DC1700	T	*DESTROYED	0000	0000	
FINAL TOTALS						
TOTAL 782,336						

```
* * *  E N D  O F  R E P O R T  * * *
```

Figure 122 (Part 2 of 2). Net Size Change (in Bytes) of Individual Segments

10.5.6 Report Title - Net Size Change, Grouped by (Name, Object Type, Segment Type)

This report is produced from Command Option - TEMP Segment/Objects?

```
Net size change, grouped by (name, obj-type, seg-type).
(total net change at bottom of report)
   QUERY NAME . . . . . NETOBJRPT2
   LIBRARY NAME . . . . SMTRACE
   FILE         LIBRARY      MEMBER       FORMAT
   NETOBJRPT1   PFREXP2      PEXTRACE     NETOBJRPT1
   DATE . . . . . 08/02/96
   TIME . . . . . 19:05:20


                Net size   Object/Segment                 Description
                change     name,
                (bytes)    obj type, seg type
                 221,184   UIM_TEMPORARY_WORKSP 19EF 0001  TEMPORARY - SPACE
                 155,648   *DESTROYED           0000 0000
                 131,072   PAG                  01EF 0007  TEMPORARY - ACCESS GROUP
                  73,728   QWCCDSACORDERINDEX   0EEF 0001  TEMPORARY - INDEX
                  40,960   QWCCDSACJOBINDEX     0EEF 0001  TEMPORARY - INDEX
                  32,768   QCAWAREA             19FC 0001  PROTECTED SPACE
                  24,576   QCAWAREA             19EF 0001  TEMPORARY - SPACE
                  16,384   QCAPLIST             19FC 0001  PROTECTED SPACE
                  16,384   A960126A             0EC4 0001  INTERACTIVE PROFILE
                  12,288   QCAPLIST             19EF 0001  TEMPORARY - SPACE
                  12,288   C3E62C036004         0000 20D9  TOMBSTONE SEGMENT
                   8,192   WMHQ Data Queue Cach 19EF 0001  TEMPORARY - SPACE
                   8,192   EE32788FC300         0000 20D6  HEAP DATA SEGMENT TYPE
                   8,192   D2AF210B2004         0000 20B1  DATA SPACE RUN TIME SID
                   4,096   QMAIR                19EF 0001  TEMPORARY - SPACE
                   4,096   E7CB3ED36004         0000 20D9  TOMBSTONE SEGMENT
                   4,096   D0CB5E80AD00         19EF 0001  TEMPORARY - SPACE
                   4,096   CA4A7FFD5700         0000 20AB  MWS AREA CTL SID
                   4,096   A960126A             0EC4 0002  INTERACTIVE PROFILE
FINAL TOTALS
TOTAL              782,336
* * *  E N D  O F  R E P O R T  * * *
```

Figure 123. Net Size Change, Grouped by Name/Object-Type/Segment-Type

10.5.7 Report Title - Net Size Change, Grouped by Object/Segment Description

This report is produced from Command Option - TEMP Segment/Objects?

```
Net size change, grouped by Object/Segment description.
Destroyed and unknown types group under a blank description.
Total net size change at bottom of report.
     QUERY NAME . . . . . NETDSCRPT2
     LIBRARY NAME . . . . SMTRACE
     FILE         LIBRARY      MEMBER       FORMAT
     NETDSCRPT1   PFREXP2      PEXTRACE     NETDSCRPT1
     DATE . . . . . 08/02/96
     TIME . . . . . 19:05:21


08/02/96  19:05:21                                    PAGE    1
                Net size change   Description
                (bytes)
                       274,432   TEMPORARY - SPACE
                       155,648
                       131,072   TEMPORARY - ACCESS GROUP
                       114,688   TEMPORARY - INDEX
                        49,152   PROTECTED SPACE
                        20,480   INTERACTIVE PROFILE
                        16,384   TOMBSTONE SEGMENT
                         8,192   DATA SPACE RUN TIME SID
                         8,192   HEAP DATA SEGMENT TYPE
                         4,096   MWS AREA CTL SID
FINAL TOTALS
TOTAL                  782,336
* * *  E N D  O F  R E P O R T  * * *
```

Figure 124. Net Size Change, Grouped by Object/Segment Description

10.5.8 Report Title - Net Size Change by Job or Task

This report is produced from Command Option - TEMP Segment/Objects?

```
                                        Net size change by Job or Task.
                                    QUERY NAME . . . . . NETTDERPT2
                                    LIBRARY NAME . . . . SMTRACE
                                    FILE         LIBRARY      MEMBER       FORMAT
                                    NETTDERPT1   PFREXP2      PEXTRACE     NETTDERPT1
                                    TASKINFO     PFREXP2      PEXTRACE     TASKINFO
                                    DATE . . . . . . . . . 08/02/96
                                    TIME . . . . . . . . . 19:05:24


            Net size change   TDE       Job/Task name     Job         Job
            (bytes)           number                      user        number
                   335,872   0000881E  PEXTRACE          A960126A    053555
                   184,320   00007F6C  P23ARTVKE         A960126A    053319
                   102,400   0000880E  ILEAGNEW          A960126A    053541
                    69,632   00008408  JUNK              QSPLJOB     053464
                    65,536   00008814  OPENBAD           A960126A    053546
                    24,576   00008810  TSTIOC            A960126A    053543
FINAL TOTALS
TOTAL               782,336
* * *  E N D  O F  R E P O R T  * * *
```

Figure 125. Net Size Change by Job or Task

10.5.9 Report Title - Net Size Change (in Bytes) of Individual Segments

This report is produced from Command Option - PERM Segment/Objects?

```
                                Net size change (in bytes) of individual segments.
                                (total size change at bottom of report)
                                QUERY NAME . . . . . NETSIDRPT
                                LIBRARY NAME . . . . SMTRACE
                                FILE         LIBRARY      MEMBER       FORMAT
                                NETSIDOBJ2   PFREXP2      PEXTRACE     NETSIDOBJ2
                                DATE . . . . . 08/02/96
                                TIME . . . . . 19:05:26


                 Net size     Object/segment  SID   Object/segment        Object  Segment  Description
                 change       address         type  name                  type    type
                 (in bytes)
                     16,384    315B69CF2300     P   QJOBMSGQ               18A0    0001    JOB MESSAGE QUEUE
                     12,288    1579A708B100    DP   PF132     PEXTRACSTS   0B90    0003    COMPOSITE PIECE - DATA SPACE
                      4,096    2DEBC2366600    DP   PF132     PEXTRACSTS   0B90    0001    COMPOSITE PIECE - DATA SPACE
                      4,096    232D272FB900     P   QSPSCB                 19C2    0001    SPOOL CTL BLOCK
                      4,096    3D078BDAFC00     P   PF132     PEXTRACSTS   0D50    0001    DATA BASE FILE MEMBER
FINAL TOTALS
TOTAL                40,960
* * *  E N D  O F  R E P O R T  * * *
```

Figure 126. Net Size Change (in bytes) of Individual Segments

10.5.10 Report Title - Net Size Change, Grouped by (Name, Object Type, Segment Type)

This report is produced from Command Option - PERM Segment/Objects?

```
                    Net size change, grouped by (name, obj-type, seg-type).
                    (total net change at bottom of report)
                       QUERY NAME . . . . . NETOBJRPT2
                       LIBRARY NAME . . . . SMTRACE
                       FILE         LIBRARY      MEMBER       FORMAT
                       NETOBJRPT1   PFREXP2      PEXTRACE     NETOBJRPT1
                       DATE . . . . . . . . 08/02/96
                       TIME . . . . . . . . 19:05:27


                  Net size   Object/Segment                 Description
                  change     name,
                  (bytes)    obj type, seg type
                    16,384   QJOBMSGQ             18AO 0001  JOB MESSAGE QUEUE
                    12,288   PF132     PEXTRACSTS 0B90 0003  COMPOSITE PIECE - DATA SPACE
                     4,096   QSPSCB               19C2 0001  SPOOL CTL BLOCK
                     4,096   PF132     PEXTRACSTS 0D50 0001  DATA BASE FILE MEMBER
                     4,096   PF132     PEXTRACSTS 0B90 0001  COMPOSITE PIECE - DATA SPACE
FINAL TOTALS
TOTAL                40,960
* * *  E N D  O F  R E P O R T  * * *
```

Figure 127. Net Size Change, Grouped by Name/Object-Type/Segment-Type

10.5.11 Report Title - Net Size Change, Grouped by Object/Segment Description

This report is produced from Command Option - PERM Segment/Objects?

```
                    Net size change, grouped by Object/Segment description.
                    Destroyed and unknown types group under a blank description.
                    Total net size change at bottom of report.
                         QUERY NAME . . . . . NETDSCRPT2
                         LIBRARY NAME . . . . SMTRACE
                         FILE         LIBRARY      MEMBER       FORMAT
                         NETDSCRPT1   PFREXP2      PEXTRACE     NETDSCRPT1
                         DATE . . . . . . . . 08/02/96
                         TIME . . . . . . . . 19:05:28


08/02/96  19:05:28                                        PAGE    1
                Net size change   Description
                (bytes)
                        16,384   COMPOSITE PIECE - DATA SPACE
                        16,384   JOB MESSAGE QUEUE
                         4,096   DATA BASE FILE MEMBER
                         4,096   SPOOL CTL BLOCK
FINAL TOTALS
TOTAL                   40,960
* * *  E N D  O F  R E P O R T  * * *
```

Figure 128. Net Size Change, Grouped by Object/Segment Description

10.5.12 Report Title - Net Size Change by Job or Task

This report is produced from Command Option - PERM Segment/Objects?

```
                                        Net size change by Job or Task.
                                    QUERY NAME . . . . . NETTDERPT2
                                    LIBRARY NAME . . . . SMTRACE
                                    FILE         LIBRARY      MEMBER       FORMAT
                                    NETTDERPT1   PFREXP2      PEXTRACE     NETTDERPT1
                                    TASKINFO     PFREXP2      PEXTRACE     TASKINFO
                                    DATE . . . . . . . . . 08/02/96
                                    TIME . . . . . . . . . 19:05:29

            Net size change   TDE       Job/Task name     Job         Job
            (bytes)           number                      user        number
                    24,576    0000881E  PEXTRACE          A960126A    053555
                    16,384    0000880E  ILEAGNEW          A960126A    053541
FINAL TOTALS
TOTAL               40,960
* * *  E N D  O F  R E P O R T  * * *
```

Figure 129. Net Size Change by Job or Task

10.6 Address Consumption - Query Temporary/Permanent Addresses (ADDR Command)

This section provides an example of every report you can produce using this command.

Please refer to Section 6.6.6, “ADDR Reporting Command” on page 160 for a details of how to use the ADDR command to produce these reports.

Refer to Table 13 on page 168 for details of the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

10.6.1 Report Title - Big Sid Creates per TDE, in Descending Sequence

```
 Big Sid creates per TDE, in descending sequence.
QUERY NAME . . . . . ASMADRCRT9
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
ASMADRCRT8   PFREXP2      PEXTRACE     ASMADRCRT8
ASMADRCRT7   PFREXP2      PEXTRACE     ASMADRCRT7
DATE . . . . . 08/02/96
TIME . . . . . 19:05:50
```

TDE # (HEX)	Task/Job Name	Job user	Job #	Total Big Sids	% of System	Big temps	% of System	Big Perms	% of System	Big PAG Mbrs
00008814	OPENBAD	A960126A	053546	3,704	68.9	1,854	68.1	0	.0	1,850
00008810	TSTIOC	A960126A	053543	1,494	27.8	749	27.5	0	.0	745
00008408	JUNK	QSPLJOB	053464	96	1.8	62	2.3	0	.0	34
0000881E	PEXTRACE	A960126A	053555	51	.9	31	1.1	4	100.0	16
00007F6C	P23ARTVKE	A960126A	053319	9	.2	9	.3	0	.0	0
00007F2E	QBRMNET	QPGMR	053289	8	.1	4	.1	0	.0	4
00000116	SK-ASCOO7P			6	.1	6	.2	0	.0	0
0000880E	ILEAGNEW	A960126A	053541	6	.1	4	.1	0	.0	2
000000EC	SCPF	QSYS	000000	2	.0	1	.0	0	.0	1
0000004C	SMSIGNALEVENT			2	.0	2	.1	0	.0	0
00000092	SMXCSPRVSR			1	.0	1	.0	0	.0	0
			TOTAL	5,379		2,723		4		2,652

```
* * *  E N D  O F  R E P O R T  * * *
```

Figure 130. Big SID Creates per TDE, in Descending Sequence

10.6.2 Report Title - SID Creates by MI Program and Offset

```
                                        Sid creates by MI pgm and offset.
                                    QUERY NAME . . . . . ASMMICRT5
                                    LIBRARY NAME . . . . SMTRACE
                                    FILE         LIBRARY      MEMBER       FORMAT
                                    ASMMICRT2    PFREXP2      PEXTRACE     ASMMICRT2
                                    ASMMICRT4    PFREXP2      PEXTRACE     ASMMICRT4
                                    DATE . . . . . 08/02/96
                                    TIME . . . . . 19:06:03

SLIC/MI PGM        # of Sid's  % of
& OFFSET           created     System
                        5,379   100.0
QDMCOPEN   006528       2,638    49.0
QDBOPEN    00D164       2,600    48.3
QDBOPEN    01850C          30      .6
QCMDEXC    002094          14      .3
QCMDEXC    001FB4          14      .3
QWCCDSTC   00BA4C          12      .2
QSYACCIP   0025E0          10      .2
QUIMGFLW   0038F0           4      .1
QUILIST    00C7BC           3      .1
QSPOPEN    014040           5      .1
QSPCPYF    0083C8           3      .1
QSOKERN3   017274           6      .1
QCLRSLV    00463C           3      .1
QCLRSLV    00455C           3      .1
QCLRSLV    004374           3      .1
QCLRSLV    004290           3      .1
QCATRS     0039C4           3      .1
#skverb    006298           6      .1
SmXcJobM   0000A4           1      .0
SmUcr      0000D0           1      .0
SmAcr      0000D0           1      .0
QWCCDSTC   00E6EC           1      .0
QWCCDSAC   003894           2      .0
QUIPRINT   011690           2      .0
QUIOPEN    004A44           2      .0
QUICBINT   00187C           1      .0
QRCVDTAQ   002F60           1      .0
QDBCRTME   0073A0           2      .0
QDBCRTME   00414C           1      .0
QDBCRTME   00ADF0           1      .0
QC2UTIL1   00591C           1      .0
ILEAGNEW   001968           2      .0
* * *  E N D  O F  R E P O R T  * * *
```

Figure 131. Sid Creates by MI Program and Offset

10.6.3 Report Title - Big Sid Creates by MI Program Without Offset

```
     Big Sid creates by MI PGM without Offset
QUERY NAME . . . . . ASMMICRT6
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
ASMMICRT3    PFREXP2      PEXTRACE     ASMMICRT3
ASMMICRT4    PFREXP2      PEXTRACE     ASMMICRT4
DATE . . . . . 08/02/96
TIME . . . . . 19:06:04
```

```
08/02/96  19:06:04    PAGE    1
SLIC/MI     # of SID's  % of
PGM         created     System
               5,379   100.0
QDMCOPEN       2,638    49.0
QDBOPEN        2,630    48.9
QCMDEXC           28      .5
QWCCDSTC          13      .2
QSYACCIP          10      .2
QCLRSLV           12      .2
QUIMGFLW           4      .1
QUILIST            3      .1
QSPOPEN            5      .1
QSPCPYF            3      .1
QSOKERN3           6      .1
QDBCRTME           4      .1
QCATRS             3      .1
#skverb            6      .1
SmXcJobM           1      .0
SmUcr              1      .0
SmAcr              1      .0
QWCCDSAC           2      .0
QUIPRINT           2      .0
QUIOPEN            2      .0
QUICBINT           1      .0
QRCVDTAQ           1      .0
QC2UTIL1           1      .0
ILEAGNEW           2      .0
* * *  E N D  O F  R E P O R T  * * *
```

Figure 132. Big Sid Creates by MI Program without Offset

10.6.4 Report Title - Big Sid Creates per MI/SLIC Program and Type

```
                    Big Sid creates per MI/SLIC PGM  and type
                  QUERY NAME . . . . . ASMMITYPE8
                  LIBRARY NAME . . . . SMTRACE
                  FILE         LIBRARY      MEMBER       FORMAT
                  ASMMITYPE6   PFREXP2      PEXTRACE     ASMMITYPE6
                  ASMMITYPE7   PFREXP2      PEXTRACE     ASMMITYPE7
                  DATE . . . . . 08/02/96
                  TIME . . . . . 19:06:19

MI/SLIC           Total     % of          Big    % of          Big    % of        Big       % of
PGM               Big Sids  System        temps  System        Perms  System      PAG Mbrs  system
QDMCOPEN             2,638   49.0             0     .0            0     .0          2,638   99.5
QDBOPEN              2,630   48.9         2,630   96.6            0     .0              0     .0
QCMDEXC                 28     .5            28    1.0            0     .0              0     .0
QWCCDSTC                13     .2            13     .5            0     .0              0     .0
QCLRSLV                 12     .2            12     .4            0     .0              0     .0
QSYACCIP                10     .2            10     .4            0     .0              0     .0
#skverb                  6     .1             6     .2            0     .0              0     .0
QSOKERN3                 6     .1             6     .2            0     .0              0     .0
QSPOPEN                  5     .1             0     .0            0     .0              5     .2
QDBCRTME                 4     .1             0     .0            4  100.0              0     .0
QUIMGFLW                 4     .1             4     .1            0     .0              0     .0
QCATRS                   3     .1             0     .0            0     .0              3     .1
QSPCPYF                  3     .1             0     .0            0     .0              3     .1
QUILIST                  3     .1             3     .1            0     .0              0     .0
ILEAGNEW                 2     .0             0     .0            0     .0              2     .1
QUIOPEN                  2     .0             2     .1            0     .0              0     .0
QUIPRINT                 2     .0             2     .1            0     .0              0     .0
QWCCDSAC                 2     .0             2     .1            0     .0              0     .0
QC2UTIL1                 1     .0             0     .0            0     .0              1     .0
QRCVDTAQ                 1     .0             1     .0            0     .0              0     .0
QUICBINT                 1     .0             1     .0            0     .0              0     .0
SmAcr                    1     .0             1     .0            0     .0              0     .0
SmUcr                    1     .0             1     .0            0     .0              0     .0
SmXcJobM                 1     .0             1     .0            0     .0              0     .0
     TOTAL           5,379                2,723                     4                2,652
* * *  E N D  O F  R E P O R T  * * *
```

Figure 133. Big Sid Creates per MI/SLIC Program and Type

10.6.5 Report Title - Big Sid Creates per MI/SLIC Program and Type

```
    Big Sid creates per MI/SLIC PGM  and type
QUERY NAME . . . . . ASMMITYP8
LIBRARY NAME . . . . SMTRACE
FILE         LIBRARY      MEMBER       FORMAT
ASMMITYP6    PFREXP2      PEXTRACE     ASMMITYP6
ASMMITYP7    PFREXP2      PEXTRACE     ASMMITYP7
DATE . . . . . 08/02/96
TIME . . . . . 19:06:35
```

MI PGM crt's with SLIC	PGM	Total Big Sids	% of System	Big temps	% of System	Big Perms	% of System	Big PAG Mbrs	% of system
QDMCOPEN	#dbdupcr	2,633	48.9	0	.0	0	.0	2,633	99.3
QDBOPEN	#socrt	2,630	48.9	2,630	96.6	0	.0	0	.0
QCMDEXC	#socrt	28	.5	28	1.0	0	.0	0	.0
QCLRSLV	#socrt	12	.2	12	.4	0	.0	0	.0
QSYACCIP	#iicrtix	10	.2	10	.4	0	.0	0	.0
#skverb	#skverb	6	.1	6	.2	0	.0	0	.0
QSOKERN3	#skverb	6	.1	6	.2	0	.0	0	.0
QWCCDSTC	SmAcr	6	.1	6	.2	0	.0	0	.0
QWCCDSTC	SmUcr	6	.1	6	.2	0	.0	0	.0
QDMCOPEN	#rmcdupo	5	.1	0	.0	0	.0	5	.2
QSPOPEN	#dbdupcr	5	.1	0	.0	0	.0	5	.2
QUIMGFLW	#socrt	4	.1	4	.1	0	.0	0	.0
QCATRS	PmAttrib	3	.1	0	.0	0	.0	3	.1
QSPCPYF	#dbdupcr	3	.1	0	.0	0	.0	3	.1
QUILIST	#socrt	3	.1	3	.1	0	.0	0	.0
ILEAGNEW	PmAttrib	2	.0	0	.0	0	.0	2	.1
QUIOPEN	#socrt	2	.0	2	.1	0	.0	0	.0
QUIPRINT	#socrt	2	.0	2	.1	0	.0	0	.0
QWCCDSAC	#iicrtix	2	.0	2	.1	0	.0	0	.0
QC2UTIL1	PmAttrib	1	.0	0	.0	0	.0	1	.0
QDBCRTME	#dbbldcr	1	.0	0	.0	1	25.0	0	.0
QDBCRTME	#dbcds	1	.0	0	.0	1	25.0	0	.0
QDBCRTME	#dbxtnds	1	.0	0	.0	1	25.0	0	.0
QDBCRTME	#socrt	1	.0	0	.0	1	25.0	0	.0
QRCVDTAQ	#socrt	1	.0	1	.0	0	.0	0	.0
QUICBINT	#socrt	1	.0	1	.0	0	.0	0	.0
QWCCDSTC	#socrt	1	.0	1	.0	0	.0	0	.0
SmAcr	SmAcr	1	.0	1	.0	0	.0	0	.0
SmUcr	SmUcr	1	.0	1	.0	0	.0	0	.0
SmXcJobM	SmXcJobM	1	.0	1	.0	0	.0	0	.0
	TOTAL	5,379		2,723		4		2,652	

```
* * *  E N D  O F  R E P O R T  * * *
```

Figure 134. Big Sid Creates per MI/SLIC Program and Type

10.7 Size of Objects Used During PEX Trace Collection - Obj/Seg Sizes from PEX Files (OBJSIZE Command)

This section provides an example of every report you can produce using this command.

Please refer to Section 6.6.7, “OBJSIZE Reporting Command” on page 161 for a details of how to use the OBJSIZE command to produce these reports.

Refer to Table 13 on page 168 for details of the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

10.7.1 Report Title-Size of Objects Which Were Touched During the STRPEX Run

```
Size of object which where touched during the STRPEX run.
Note: this is not the "size touched", but rather the gross obj/seg size
      of objects which were touched (at least once).
           QUERY NAME . . . . . OBJSIZ4
           LIBRARY NAME . . . . SMTRACE
           FILE         LIBRARY      MEMBER       FORMAT
           OBJSIZ2      PFREXP2      PEXTRACE     OBJSIZ2
           DATE . . . . . 08/02/96
           TIME . . . . . 19:06:41
```

Object size (in bytes)	Segment start address	Object/segment name	Obj/Seg type	Type description	Library name
6,288,281,600	E7D83F7CEE000000	ILEAGNEW A960126A	1AEF	TEMPORARY - PROCESS CTL SPACE	
845,504,512	ED19E0C682000000	JUNK QSPLJOB	1AEF	TEMPORARY - PROCESS CTL SPACE	
39,645,184	EAE54218B3000000	OPENBAD A960126A	1AEF	TEMPORARY - PROCESS CTL SPACE	
16,777,216	FFFFFFFFC3000000	L/L RANGE 1	0000	L/L RANGE 1	
16,777,216	FFFFFFFFC6000000	L/L RANGE 1	0000	L/L RANGE 1	
11,800,576	250AFFDED4000000	QWCBT01	19D0	WORK CONTROL BLOCK TABLE	QSYS
10,485,760	FFFFFFFFC4000000	L/L RANGE 1	0000	L/L RANGE 1	
7,610,368	39A06455CF000000	QCPFMSG	0E03	MESSAGE FILE	QSYS
7,217,152	1E8C20653F000000	QSYS	1952	OIR SPACE	
6,529,024	320A78C57E000000	PF01 PF01	0B90	COMPOSITE PIECE - DATA SPACE	PFREXP2
3,178,496	EC4B832819000000	QSERVER QSYS	1AEF	TEMPORARY - PROCESS CTL SPACE	
1,990,656	235AD66C7B000000	SQCCSID1	0ED2	CCSID INFORMATION OBJECT	QSYS
1,851,392	C2D22017B1000000	C2D22017B1000000	20AC	MWS AREA DATA SID	
1,773,568	24519880B6000000	QSECOFR	0801	USER PROFILE	
1,748,992	3138C3777D000000	QDFTOWN	0801	USER PROFILE	
1,224,704	3095F015C2000000	QSYSOPR	1902	MESSAGE QUEUE	QSYS
1,220,608	C0000020010000000	SEIZE LOCK RANGE	2081	SEIZE LOCK RANGE	
1,126,400	38C92A0D7A000000	QSOKERN3	0203	SERVICE PROGRAM	QSYS
1,048,576	D1EDE9BC47000000	D1EDE9BC47000000	20AC	MWS AREA DATA SID	
806,912	0081A1324C000000	QP0LLFS1	0203	SERVICE PROGRAM	QSYS
806,912	03618FB7D8000000	QDBSHR	0801	USER PROFILE	
663,552	36FE3B92F4000000	QSYS	0E90	COMPOSITE PIECE - INDEX	
552,960	1FBB7330C2000000	QC2IO	0203	SERVICE PROGRAM	QSYS
536,576	27E271EE5E000000	QSYS	0401	LIBRARY	
532,480	D485767561000000	D485767561000000	0000		
532,480	2F60307D81000000	QHST96213D QHST96213D	0B90	COMPOSITE PIECE - DATA SPACE	QSYS
495,616	34D70EC6D7000000	QLEAWI	0203	SERVICE PROGRAM	QSYS
483,328	13D9941C47000000	QSPL	0801	USER PROFILE	
442,368	2949B8D65D000000	QC2UTIL1	0203	SERVICE PROGRAM	QSYS
409,600	ECB9E6FE0E000000	ECB9E6FE0E000000	20DF	MUTEX TEMP SEGMENT	
344,064	FC88D12A57000000	FC88D12A57000000	20D6	HEAP DATA SEGMENT TYPE	
335,872	1DAD0DD754000000	PF05 PF05	0B90	COMPOSITE PIECE - DATA SPACE	PFREXP2
335,872	3D9568FC6C000000	PF02 PF02	0B90	COMPOSITE PIECE - DATA SPACE	PFREXP2
335,872	3EF1A3BC45000000	PF04 PF04	0B90	COMPOSITE PIECE - DATA SPACE	PFREXP2
335,872	21927461OF000000	PF03 PF03	0B90	COMPOSITE PIECE - DATA SPACE	PFREXP2
319,488	3E300EBD51000000	QYPPRT	0203	SERVICE PROGRAM	QSYS
299,008	3B1FB248A9000000	QSOSRV2	0203	SERVICE PROGRAM	QSYS
286,720	C517F58CA9000000	C517F58CA9000000	20D6	HEAP DATA SEGMENT TYPE	
280,576	0E370654F8000000	QJOBMSGQ	18A0	JOB MESSAGE QUEUE	

Figure 135 (Part 1 of 7). Size of Objects that were Touched during the STRPEX Run

Object size (in bytes)	Segment start address	Object/segment name	Obj/Seg type	Type description	Library name
262,144	E43BF962E5000000	E43BF962E5000000	20AC	MWS AREA DATA SID	
262,144	129F787018000000	QTCPMSGF	0E03	MESSAGE FILE	QTCP
258,048	FF834BEEBC000000	PAG	01EF	TEMPORARY - ACCESS GROUP	
229,376	1A72CA4E6B000000	QWPALLOC	0201	PROGRAM	QSYS
217,088	0255BE6EF4000000	QDBOPEN	0201	PROGRAM	QSYS
180,224	0DE83DDD25000000	QPOLLIB1	0203	SERVICE PROGRAM	QSYS
167,936	3F32381BCB000000	QTQSRVP2	0203	SERVICE PROGRAM	QSYS
149,504	1C6389948D000000	QJOBMSGQ	18A0	JOB MESSAGE QUEUE	
147,456	0FC4E3DCBC000000	QUSRSYS	0401	LIBRARY	
143,360	0FF51A76C7000000	QSPSIDQ	0EC7	PRINT QUEUE	QSPL
135,168	07015FCEEC000000	QGWCSSTS	1915	PANEL GROUP DEFINITION	QSYS
135,168	241E2B25C8000000	QDBGETM	0201	PROGRAM	QSYS
131,072	180EBCA981000000	QTGTNTOC	0201	PROGRAM	QTCP
126,976	3F3A85EC1B000000	QMHSNDPM	0201	PROGRAM	QSYS
126,976	06972D6978000000	OPEN5	0201	PROGRAM	PFREXP2
122,880	D2FB76C772000000	D2FB76C772000000	20D6	HEAP DATA SEGMENT TYPE	
118,784	3CEBB73B4B000000	QTMPLPRC	0201	PROGRAM	QTCP
106,496	053444642E000000	TESTIO	0201	PROGRAM	HATT
106,496	14EDD2AFED000000	QRNXIE	0203	SERVICE PROGRAM	QSYS
98,304	CD3A851305000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
98,304	299FA1DB51000000	QSPCPYF	0201	PROGRAM	QSYS
94,208	EE32788FC3000000	EE32788FC3000000	20D6	HEAP DATA SEGMENT TYPE	
94,208	19C53AB375000000	A960126A	0801	USER PROFILE	
94,208	30ED4D9D71000000	QUIMGFLW	0201	PROGRAM	QSYS
94,208	1AF49857A2000000	DSPOBJD DSPOBJD	0B90	COMPOSITE PIECE - DATA SPACE	PFREXP2
90,112	38E3AD9CF4000000	QSPCHJOB	0201	PROGRAM	QSYS
90,112	2E495FB3E8000000	QPOSSRV4	0203	SERVICE PROGRAM	QSYS
86,016	2EB8AEEFA2000000	QUILIST	0201	PROGRAM	QSYS
81,920	CB2F24EC42000000	CB2F24EC42000000	20D6	HEAP DATA SEGMENT TYPE	
81,920	0B494CF4EC000000	QMHRSNEM	0201	PROGRAM	QSYS
81,920	046826E382000000	QUICMD	0201	PROGRAM	QSYS
81,920	3065C001CB000000	QSPRMTDR	0201	PROGRAM	QSYS
81,920	171EF7AFE3000000	QUIOPEN	0201	PROGRAM	QSYS
73,728	FCFA2024DA000000	FCFA2024DA000000	20D6	HEAP DATA SEGMENT TYPE	
73,728	1CF2254F0A000000	QSPCLOSE	0201	PROGRAM	QSYS
73,728	1C96EBBC4D000000	QWPZHPT1	0203	SERVICE PROGRAM	QSYS
73,728	0B006AC516000000	ILEAGN	0201	PROGRAM	PFREXP2
73,728	232DBEB8B4000000	QUIICHK	0201	PROGRAM	QSYS
69,632	1D3EDC4ED2000000	QGWCAJOB	1915	PANEL GROUP DEFINITION	QSYS

Figure 135 (Part 2 of 7). Size of Objects that were Touched during the STRPEX Run

Object size (in bytes)	Segment start address	Object/segment name	Obj/Seg type	Type description	Library name
65,536	FD46578079000000	FD46578079000000	20AC	MWS AREA DATA SID	
65,536	CB409AF8A0040000	CB409AF8A0040000	20D7	ACTIVATION PROC REF TBL	
65,536	F836A3DBEA000000	F836A3DBEA000000	20AC	MWS AREA DATA SID	
65,536	D2624DD3F0040000	D2624DD3F0040000	20D9	TOMBSTONE SEGMENT	
65,536	F4E3FAD8D0040000	F4E3FAD8D0040000	20D7	ACTIVATION PROC REF TBL	
65,536	03CABF2D39000000	QTQICVC2	0203	SERVICE PROGRAM	QSYS
65,536	16792E46BD000000	QLIDLOBJ	0201	PROGRAM	QSYS
61,440	1FCDB3C896000000	QTQICONV	0203	SERVICE PROGRAM	QSYS
57,344	38791EFBA8000000	QSOSRV1	0203	SERVICE PROGRAM	QSYS
49,152	02D13EC128000000	QSPCNSPF	0201	PROGRAM	QSYS
49,152	0F98F1D684000000	PFREXP2	0401	LIBRARY	
49,152	32807ODA54000000	HATT	0401	LIBRARY	
49,152	04465BB6D5000000	QSPHNMLT	0201	PROGRAM	QSYS
49,152	C0A90C8129000000	QTEMP	04C1	INTERNAL QTEMP LIBRARY	
45,056	C3E62C0360040000	C3E62C0360040000	20D9	TOMBSTONE SEGMENT	
45,056	E7CB3ED360040000	E7CB3ED360040000	20D9	TOMBSTONE SEGMENT	
45,056	094FA2E92A000000	TESTIOC	0201	PROGRAM	PFREXP2
45,056	2EA8E90DA6000000	ILEAGNEW	0201	PROGRAM	PFREXP2
45,056	0C5CB9677C000000	QPOWPIDI	0203	SERVICE PROGRAM	QSYS
40,960	12466B188B000000	QPOWPID	0203	SERVICE PROGRAM	QSYS
40,960	3D7FEB7825000000	QUIALIST	0201	PROGRAM	QSYS
36,864	000000000E000000	DATA BASE IN-USE TBL	2083	DATA BASE IN-USE TBL	
36,864	2B6479F3E5000000	QTMPCKP	0201	PROGRAM	QTCP
36,864	14F2DA89E7000000	QRCVDTAQ	0201	PROGRAM	QSYS
36,864	2F98435534000000	QWTCCRLJ	0201	PROGRAM	QSYS
36,864	01E928D3C3000000	QUICLOSE	0201	PROGRAM	QSYS
36,864	E3780192EB000000	QWCCDSACJOBSPACE	19EF	TEMPORARY - SPACE	
34,816	0ABB0C0204000000	QJOBMSGQ	18A0	JOB MESSAGE QUEUE	
32,768	1CD4BDCBEB000000	QPOSSRV3	0203	SERVICE PROGRAM	QSYS
32,768	C3E43389E6000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
32,768	13B603C8EC000000	QLICHLLE	0201	PROGRAM	QSYS
32,768	0C4CD3B08A000000	QSPRCMBR	0201	PROGRAM	QSYS
28,672	3E093A4267000000	QEZWRAST	0201	PROGRAM	QSYS
28,672	28E370F22F000000	OPENBAD	0201	PROGRAM	PFREXP2
28,672	0BB6750747000000	QYPEENDP	0201	PROGRAM	QSYS
28,672	1E93026233000000	QTCP	0401	LIBRARY	
28,672	117EC2FAAF000000	QUSDLTUS	0201	PROGRAM	QSYS
24,576	2E96BC585F000000	QDMCRODP	0201	PROGRAM	QSYS
24,576	0296363C8E000000	QCAIFLD	0201	PROGRAM	QSYS

Figure 135 (Part 3 of 7). Size of Objects that were Touched during the STRPEX Run

Object size (in bytes)	Segment start address	Object/segment name	Obj/Seg type	Type description	Library name
24,576	1BB77EC151000000	QUICBINT	0201	PROGRAM	QSYS
24,576	F08C744308000000	QWTPIPJ	0EEF	TEMPORARY - INDEX	
24,576	ECCE531C0A000000	QWCCDSACJOBINDEX	0EEF	TEMPORARY - INDEX	
24,576	2E355314CE000000	QYPESVSE	0203	SERVICE PROGRAM	QSYS
24,576	EFAC0C01FF000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
22,528	315B69CF23000000	QJOBMSGQ	18A0	JOB MESSAGE QUEUE	
20,480	0BEC87C5AD000000	QCAIEXIT	0201	PROGRAM	QSYS
20,480	21A38B5342000000	QPXXDISP	0201	PROGRAM	QSYS
20,480	257C9EC842000000	A960126A	0E02	OUTPUT QUEUE	A960126A
20,480	285B53632E000000	QWCSHUIC	0201	PROGRAM	QSYS
20,480	FA6CF93A2F000000	A960126A	0EC4	INTERACTIVE PROFILE	QTEMP
20,480	07155379A8000000	QJOBMSGQ	18A0	JOB MESSAGE QUEUE	
20,480	1CF421CAC9000000	QSPDSPFX	0201	PROGRAM	QSYS
20,480	043358E866000000	QRNXDUMP	0203	SERVICE PROGRAM	QSYS
20,480	2CA3A7F834000000	QPOLDC1	0203	SERVICE PROGRAM	QSYS
20,480	13E59BF964000000	QJOBMSGQ	18A0	JOB MESSAGE QUEUE	
16,384	D7A7822472000000	D7A7822472000000	20BB	MODUL2 STATIC STORE	
16,384	EEE05252CB000000	EEE05252CB000000	20BB	MODUL2 STATIC STORE	
16,384	02BEB6E9C8000000	QWTPMHDJ	0201	PROGRAM	QSYS
16,384	2DEBC23666000000	PF132 PEXTRACSTS	0B90	COMPOSITE PIECE - DATA SPACE	PFREXP2
16,384	00D950D231000000	QSPUDTQ	0EC7	PRINT QUEUE	QSPL
16,384	1C6098F977000000	QUIRCLAP	0201	PROGRAM	QSYS
16,384	3BBB16FD1F000000	QWCDLYJB	0201	PROGRAM	QSYS
16,384	EB3F994F8E000000	QSO_DNS_INDEX	0EEF	TEMPORARY - INDEX	
16,384	E114192F4C000000	QWCCDSACORDERINDEX	0EEF	TEMPORARY - INDEX	
16,384	10D99BF32E000000	QCACHLBL	0201	PROGRAM	QSYS
16,384	15BA92923E000000	QSPQJBQ	0EC7	PRINT QUEUE	QSPL
16,384	286735A47C000000	QSPFRMQ	0EC7	PRINT QUEUE	QSPL
16,384	2E600057BC000000	QATOCLS1 SERVICES	0D50	DATA BASE FILE MEMBER	QUSRSYS
16,384	0DB384DE55000000	Q04079N002Q097276464	0B90	COMPOSITE PIECE - DATA SPACE	QSPL
16,384	22A1BD8905000000	QSPFACB	0EC6	FILE AVAIL CTL BLOCK	QSPL
16,384	182283D7D6000000	QATOCTCPIPCONFIG	0B90	COMPOSITE PIECE - DATA SPACE	QUSRSYS
16,384	31BD872D9B000000	QSPDEVQ	0EC7	PRINT QUEUE	QSPL
16,384	31F2256946000000	QWTMMRLJ	0201	PROGRAM	QSYS
16,384	0EEFFF08F4000000	QSQENDAG	0201	PROGRAM	QSYS
16,384	EB72185C31000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
16,384	03B0D326BA000000	QSYCPYIP	0201	PROGRAM	QSYS
12,288	D56C3B528F000000	D56C3B528F000000	20D5	HEAP CONTROL SEGMENT	
12,288	E5ACA040BA000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	

Figure 135 (Part 4 of 7). Size of Objects that were Touched during the STRPEX Run

Object size (in bytes)	Segment start address	Object/segment name	Obj/Seg type	Type description	Library name
12,288	273E4D7C6C000000	QATOCTCPIPCONFIG	0C90	COMPOSITE PIECE - DATA SPACE INDEX	
12,288	D057C201C1000000	QCASQ	0AEF	TEMPORARY - QUEUE	
12,288	2E320245CE000000	QWVPDAGE	0201	PROGRAM	QSYS
8,192	FCAE14909A000000	FCAE14909A000000	20AB	MWS AREA CTL SID	
8,192	CA4A7FFD57000000	CA4A7FFD57000000	20AB	MWS AREA CTL SID	
8,192	FE38ECDB80040000	FE38ECDB80040000	20D9	TOMBSTONE SEGMENT	
8,192	DAFA13F7C2000000	QCAWAREA	19FC	PROTECTED SPACE	
8,192	EFDB55B7CF000000	QCAWAREA	19FC	PROTECTED SPACE	
8,192	C258AF143D000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
8,192	3420123416000000	QA1ANET QA1ANET	0D50	DATA BASE FILE MEMBER	QUSRBRM
8,192	CA5757D23F000000	QCAWAREA	19FC	PROTECTED SPACE	
8,192	FEF71F5C65000000	QCAWAREA	19EF	TEMPORARY - SPACE	
8,192	C20421F82A000000	QCAWAREA	19EF	TEMPORARY - SPACE	
8,192	FF061D40ED000000	QCAWAREA	19FC	PROTECTED SPACE	
8,192	365A172102000000	QATOCTCPIPCONFIG	0D50	DATA BASE FILE MEMBER	QUSRSYS
8,192	F050177F93000000	QCAWAREA	19EF	TEMPORARY - SPACE	
8,192	CB05E66536000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
8,192	F2E8585394000000	QCAWAREA	19FC	PROTECTED SPACE	
8,192	FCC280AE96000000	WMHQ Data Queue Cach	19EF	TEMPORARY - SPACE	QTEMP
8,192	F1379077A8000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
8,192	232D272FB9000000	QSPSCB	19C2	SPOOL CTL BLOCK	
8,192	FCA197E7FE000000	QCAWAREA	19FC	PROTECTED SPACE	
8,192	EA15DD9C58000000	QCAWAREA	19EF	TEMPORARY - SPACE	
8,192	DC564EB79B000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
8,192	0ECD835EEE000000	QHST	1902	MESSAGE QUEUE	QSYS
4,096	E33ADE8230040000	E33ADE8230040000	0007	ACCESS GROUP	
4,096	FF631683D0040000	FF631683D0040000	0007	ACCESS GROUP	
4,096	30AE3E05A5000000	PF03 PF03	0D50	DATA BASE FILE MEMBER	PFREXP2
4,096	045D335536000000	Q04079N002Q097276464	0D50	DATA BASE FILE MEMBER	QSPL
4,096	1F876EA75D000000	QSPSCB	19C2	SPOOL CTL BLOCK	
4,096	D7693A8A1A000000	QCAPLIST	19EF	TEMPORARY - SPACE	
4,096	2178D560F5000000	QATOCTCPIP	1901	FILE	QUSRSYS
4,096	0126426A14000000	PF01 PF01	0D50	DATA BASE FILE MEMBER	PFREXP2
4,096	35AE08B038000000	QSPSCB	19C2	SPOOL CTL BLOCK	
4,096	2301659DFA000000	QLDA	19CE	LOCAL DATA AREA	
4,096	CB5A738149000000	QCAPLIST	19FC	PROTECTED SPACE	
4,096	0CB132A102000000	PF02 PF02	0D50	DATA BASE FILE MEMBER	PFREXP2
4,096	F8594352F8000000	UIM_TEMPORARY_WORKSP	19EF	TEMPORARY - SPACE	
4,096	E0F0AADA32000000		19EF	TEMPORARY - SPACE	

Figure 135 (Part 5 of 7). Size of Objects that were Touched during the STRPEX Run

```
Object size   Segment start     Object/segment        Obj/Seg  Type description                    Library
(in bytes)    address           name                  type                                         name
     4,096    0E914432BE000000  PF05                   1901    FILE                                PFREXP2
     4,096    06EBBA858B000000  PF02                   1901    FILE                                PFREXP2
     4,096    FE1EBB6E6F000000  UIM_TEMPORARY_WORKSP    19EF    TEMPORARY - SPACE
     4,096    E93D79AE62000000  QMAIR                  19EF    TEMPORARY - SPACE                   QTEMP
     4,096    09CD84FCD8000000  QSPSCB                 19C2    SPOOL CTL BLOCK
     4,096    D0CB5E80AD000000                         19EF    TEMPORARY - SPACE
     4,096    C81E272FB4000000  UIM_TEMPORARY_WORKSP    19EF    TEMPORARY - SPACE
     4,096    DA763D25DF000000  QCAPLIST                19EF    TEMPORARY - SPACE
     4,096    C287F8CA0D000000  QCAPLIST                19EF    TEMPORARY - SPACE
     4,096    D5B7F5796E000000  Q04079N001QSPL          0DEF    DATA BASE OPERATIONAL CURSOR
     4,096    26A92182AD000000  QSPSCB                 19C2    SPOOL CTL BLOCK
     4,096    3E7BFA2217000000  QHST96213DQHST96213D    0D50    DATA BASE FILE MEMBER               QSYS
     4,096    00773373B9000000  QLDA                   19CE    LOCAL DATA AREA
     4,096    0A58EEA38C000000  QTCPASC                1906    TABLE                               QUSRSYS
     4,096    C84D70E584000000  QCAPLIST               19FC    PROTECTED SPACE
     4,096    3D078BDAFC000000  PF132      PEXTRACSTS  0D50    DATA BASE FILE MEMBER               PFREXP2
     4,096    0847F54564000000  PF04                   1901    FILE                                PFREXP2
     4,096    2A1061FC38000000  DSPOBJD    DSPOBJD     0D50    DATA BASE FILE MEMBER               PFREXP2
     4,096    2CC8D77BEA000000  PF05       PF05        0D50    DATA BASE FILE MEMBER               PFREXP2
     4,096    0BD8CEB30C000000  DSPOBJD                1901    FILE                                PFREXP2
     4,096    22EEAF20E8000000  PF01                   1901    FILE                                PFREXP2
     4,096    28264A1AEF000000  PF132                  1901    FILE                                PFREXP2
     4,096    30949F058B000000  QATTR                  1951    FILE FORMAT
     4,096    2AE8C5EA2E000000  PF03                   1901    FILE                                PFREXP2
     4,096    C60FD2C61A000000  APLIST                 19EF    TEMPORARY - SPACE
     4,096    FB3B8E2DA9000000  QCAPLIST               19FC    PROTECTED SPACE
     4,096    1928ACB3E2000000  QSNADS                 1909    SUBSYSTEM DESCRIPTION               QSYS
     4,096    D513B315B3000000  QCAPLIST               19FC    PROTECTED SPACE
     4,096    C8C232AD48000000  QCAPLIST               19EF    TEMPORARY - SPACE
     4,096    F36C2F2577000000  QCAPLIST               19FC    PROTECTED SPACE
     4,096    0D68C1AAED000000  RLSJOB                 1905    COMMAND                             QSYS
     4,096    359B523326000000  PF04       PF04        0D50    DATA BASE FILE MEMBER               PFREXP2
     4,096    020CD38FBF000000  QHST96213D             1901    FILE                                QSYS
     4,096    3AA811F995000000  QPDSPSTS               1901    FILE                                QSYS
     4,096    37E86C0247000000  CPYSPLF                1905    COMMAND                             QSYS
     4,096    2E043D57B8000000  ENDPEX                 1905    COMMAND                             QSYS
     4,096    3DBF01F089000000  QLDA                   19CE    LOCAL DATA AREA
```

Figure 135 (Part 6 of 7). Size of Objects that were Touched during the STRPEX Run

```
                Object size   Segment start     Object/segment        Obj/Seg  Type description                    Library
                (in bytes)    address           name                  type                                         name
FINAL TOTALS
TOTAL          7,282,597,888
COUNT                  232
* * *  E N D  O F  R E P O R T  * * *
```

Figure 135 (Part 7 of 7). Size of Objects that were Touched during the STRPEX Run

10.7.2 Report Title - Object/Segment Sizes, Grouped by Name and Description

```
                                Object/Segment sizes, grouped by name and description
                                  QUERY NAME . . . . . OBJSIZ6
                                  LIBRARY NAME . . . . SMTRACE
                                  FILE         LIBRARY      MEMBER       FORMAT
                                  OBJSIZ5      PFREXP2      PEXTRACE     OBJSIZ5
                                  DATE . . . . . 08/02/96
                                  TIME . . . . . 19:06:43

Object/Segment                                                    Total size       Num of obj        Average         Maximum
name and description                                              summed seg/obj   or segs           size            size
                                                                  (in bytes)
                                                                   7,282,597,888          232     31,390,508   6,288,281,600
ILEAGNEW  A960126A   TEMPORARY - PROCESS CTL SPACE                 6,288,281,600            1  6,288,281,600   6,288,281,600
JUNK      QSPLJOB    TEMPORARY - PROCESS CTL SPACE                   845,504,512            1    845,504,512     845,504,512
L/L RANGE 1          L/L RANGE 1                                      44,040,192            3     14,680,064      16,777,216
OPENBAD   A960126A   TEMPORARY - PROCESS CTL SPACE                    39,645,184            1     39,645,184      39,645,184
QWCBTO1              WORK CONTROL BLOCK TABLE                         11,800,576            1     11,800,576      11,800,576
QCPFMSG              MESSAGE FILE                                      7,610,368            1      7,610,368       7,610,368
QSYS                 OIR SPACE                                         7,217,152            1      7,217,152       7,217,152
PFO1      PFO1       COMPOSITE PIECE - DATA SPACE                      6,529,024            1      6,529,024       6,529,024
QSERVER   QSYS       TEMPORARY - PROCESS CTL SPACE                     3,178,496            1      3,178,496       3,178,496
SQCCSID1             CCSID INFORMATION OBJECT                          1,990,656            1      1,990,656       1,990,656
C2D22017B1000000     MWS AREA DATA SID                                 1,851,392            1      1,851,392       1,851,392
QSECOFR              USER PROFILE                                      1,773,568            1      1,773,568       1,773,568
QDFTOWN              USER PROFILE                                      1,748,992            1      1,748,992       1,748,992
QSYSOPR              MESSAGE QUEUE                                     1,224,704            1      1,224,704       1,224,704
SEIZE LOCK RANGE     SEIZE LOCK RANGE                                  1,220,608            1      1,220,608       1,220,608
QSOKERN3             SERVICE PROGRAM                                   1,126,400            1      1,126,400       1,126,400
D1EDE9BC47000000     MWS AREA DATA SID                                 1,048,576            1      1,048,576       1,048,576
QDBSHR               USER PROFILE                                        806,912            1        806,912         806,912
QPOLLFS1             SERVICE PROGRAM                                     806,912            1        806,912         806,912
QSYS                 COMPOSITE PIECE - INDEX                             663,552            1        663,552         663,552
QC2IO                SERVICE PROGRAM                                     552,960            1        552,960         552,960
QSYS                 LIBRARY                                             536,576            1        536,576         536,576
D485767561000000                                                         532,480            1        532,480         532,480
QHST96213DQHST96213D COMPOSITE PIECE - DATA SPACE                        532,480            1        532,480         532,480
QJOBMSGQ             JOB MESSAGE QUEUE                                   528,384            6         88,064         280,576
QLEAWI               SERVICE PROGRAM                                     495,616            1        495,616         495,616
QSPL                 USER PROFILE                                        483,328            1        483,328         483,328
QC2UTIL1             SERVICE PROGRAM                                     442,368            1        442,368         442,368
ECB9E6FE0E000000     MUTEX TEMP SEGMENT                                  409,600            1        409,600         409,600
FC88D12A57000000     HEAP DATA SEGMENT TYPE                              344,064            1        344,064         344,064
PFO2      PFO2       COMPOSITE PIECE - DATA SPACE                        335,872            1        335,872         335,872
PFO3      PFO3       COMPOSITE PIECE - DATA SPACE                        335,872            1        335,872         335,872
PFO4      PFO4       COMPOSITE PIECE - DATA SPACE                        335,872            1        335,872         335,872
PFO5      PFO5       COMPOSITE PIECE - DATA SPACE                        335,872            1        335,872         335,872
QYPPRT               SERVICE PROGRAM                                     319,488            1        319,488         319,488
QSOSRV2              SERVICE PROGRAM                                     299,008            1        299,008         299,008
C517F58CA9000000     HEAP DATA SEGMENT TYPE                              286,720            1        286,720         286,720
```

Figure 136 (Part 1 of 5). Object/Segment Sizes, Grouped by Name and Description

Object/Segment name and description		Total size summed seg/obj (in bytes)	Num of obj or segs	Average size	Maximum size
E43BF962E5000000	MWS AREA DATA SID	262,144	1	262,144	262,144
QTCPMSGF	MESSAGE FILE	262,144	1	262,144	262,144
PAG	TEMPORARY - ACCESS GROUP	258,048	1	258,048	258,048
QWPALLOC	PROGRAM	229,376	1	229,376	229,376
UIM_TEMPORARY_WORKSP	TEMPORARY - SPACE	229,376	12	19,115	98,304
QDBOPEN	PROGRAM	217,088	1	217,088	217,088
QPOLLIB1	SERVICE PROGRAM	180,224	1	180,224	180,224
QTQSRVP2	SERVICE PROGRAM	167,936	1	167,936	167,936
QUSRSYS	LIBRARY	147,456	1	147,456	147,456
QSPSIDQ	PRINT QUEUE	143,360	1	143,360	143,360
QDBGETM	PROGRAM	135,168	1	135,168	135,168
QGWCSSTS	PANEL GROUP DEFINITION	135,168	1	135,168	135,168
QTGTNTOC	PROGRAM	131,072	1	131,072	131,072
OPEN5	PROGRAM	126,976	1	126,976	126,976
QMHSNDPM	PROGRAM	126,976	1	126,976	126,976
D2FB76C772000000	HEAP DATA SEGMENT TYPE	122,880	1	122,880	122,880
QTMPLPRC	PROGRAM	118,784	1	118,784	118,784
QRNXIE	SERVICE PROGRAM	106,496	1	106,496	106,496
TESTIO	PROGRAM	106,496	1	106,496	106,496
QSPCPYF	PROGRAM	98,304	1	98,304	98,304
A960126A	USER PROFILE	94,208	1	94,208	94,208
DSPOBJD DSPOBJD	COMPOSITE PIECE - DATA SPACE	94,208	1	94,208	94,208
EE32788FC3000000	HEAP DATA SEGMENT TYPE	94,208	1	94,208	94,208
QUIMGFLW	PROGRAM	94,208	1	94,208	94,208
QPOSSRV4	SERVICE PROGRAM	90,112	1	90,112	90,112
QSPCHJOB	PROGRAM	90,112	1	90,112	90,112
QUILIST	PROGRAM	86,016	1	86,016	86,016
CB2F24EC42000000	HEAP DATA SEGMENT TYPE	81,920	1	81,920	81,920
QMHRSNEM	PROGRAM	81,920	1	81,920	81,920
QSPRMTDR	PROGRAM	81,920	1	81,920	81,920
QUICMD	PROGRAM	81,920	1	81,920	81,920
QUIOPEN	PROGRAM	81,920	1	81,920	81,920
FCFA2024DA000000	HEAP DATA SEGMENT TYPE	73,728	1	73,728	73,728
ILEAGN	PROGRAM	73,728	1	73,728	73,728
QSPCLOSE	PROGRAM	73,728	1	73,728	73,728
QUIICHK	PROGRAM	73,728	1	73,728	73,728
QWPZHPT1	SERVICE PROGRAM	73,728	1	73,728	73,728
QGWCAJOB	PANEL GROUP DEFINITION	69,632	1	69,632	69,632

Figure 136 (Part 2 of 5). Object/Segment Sizes, Grouped by Name and Description

Object/Segment name and description		Total size summed seg/obj (in bytes)	Num of obj or segs	Average size	Maximum size
CB4O9AF8AO040OOO	ACTIVATION PROC REF TBL	65,536	1	65,536	65,536
D2624DD3FO040OOO	TOMBSTONE SEGMENT	65,536	1	65,536	65,536
FD46578079000000	MWS AREA DATA SID	65,536	1	65,536	65,536
F4E3FAD8DO040OOO	ACTIVATION PROC REF TBL	65,536	1	65,536	65,536
F836A3DBEAOOOOOO	MWS AREA DATA SID	65,536	1	65,536	65,536
QLIDLOBJ	PROGRAM	65,536	1	65,536	65,536
QTQICVC2	SERVICE PROGRAM	65,536	1	65,536	65,536
QTQICONV	SERVICE PROGRAM	61,440	1	61,440	61,440
QSOSRV1	SERVICE PROGRAM	57,344	1	57,344	57,344
HATT	LIBRARY	49,152	1	49,152	49,152
PFREXP2	LIBRARY	49,152	1	49,152	49,152
QCAWAREA	PROTECTED SPACE	49,152	6	8,192	8,192
QSPCNSPF	PROGRAM	49,152	1	49,152	49,152
QSPHNMLT	PROGRAM	49,152	1	49,152	49,152
QTEMP	INTERNAL QTEMP LIBRARY	49,152	1	49,152	49,152
C3E62CO360040OOO	TOMBSTONE SEGMENT	45,056	1	45,056	45,056
E7CB3ED360040OOO	TOMBSTONE SEGMENT	45,056	1	45,056	45,056
ILEAGNEW	PROGRAM	45,056	1	45,056	45,056
QPOWPIDI	SERVICE PROGRAM	45,056	1	45,056	45,056
TESTIOC	PROGRAM	45,056	1	45,056	45,056
QPOWPID	SERVICE PROGRAM	40,960	1	40,960	40,960
QUIALIST	PROGRAM	40,960	1	40,960	40,960
DATA BASE IN-USE TBL	DATA BASE IN-USE TBL	36,864	1	36,864	36,864
QRCVDTAQ	PROGRAM	36,864	1	36,864	36,864
QTMPCKP	PROGRAM	36,864	1	36,864	36,864
QUICLOSE	PROGRAM	36,864	1	36,864	36,864
QWCCDSACJOBSPACE	TEMPORARY - SPACE	36,864	1	36,864	36,864
QWTCCRLJ	PROGRAM	36,864	1	36,864	36,864
QCAWAREA	TEMPORARY - SPACE	32,768	4	8,192	8,192
QLICHLLE	PROGRAM	32,768	1	32,768	32,768
QPOSSRV3	SERVICE PROGRAM	32,768	1	32,768	32,768
QSPRCMBR	PROGRAM	32,768	1	32,768	32,768
OPENBAD	PROGRAM	28,672	1	28,672	28,672
QEZWRAST	PROGRAM	28,672	1	28,672	28,672
QTCP	LIBRARY	28,672	1	28,672	28,672
QUSDLTUS	PROGRAM	28,672	1	28,672	28,672
QYPEENDP	PROGRAM	28,672	1	28,672	28,672
QCAIFLD	PROGRAM	24,576	1	24,576	24,576

Figure 136 (Part 3 of 5). Object/Segment Sizes, Grouped by Name and Description

Object/Segment name and description		Total size summed seg/obj (in bytes)	Num of obj or segs	Average size	Maximum size
QDMCRODP	PROGRAM	24,576	1	24,576	24,576
QSPSCB	SPOOL CTL BLOCK	24,576	5	4,915	8,192
QUICBINT	PROGRAM	24,576	1	24,576	24,576
QWCCDSACJOBINDEX	TEMPORARY - INDEX	24,576	1	24,576	24,576
QWTPIPJ	TEMPORARY - INDEX	24,576	1	24,576	24,576
QYPESVSE	SERVICE PROGRAM	24,576	1	24,576	24,576
A960126A	INTERACTIVE PROFILE	20,480	1	20,480	20,480
A960126A	OUTPUT QUEUE	20,480	1	20,480	20,480
QCAIEXIT	PROGRAM	20,480	1	20,480	20,480
QCAPLIST	PROTECTED SPACE	20,480	5	4,096	4,096
QPXXDISP	PROGRAM	20,480	1	20,480	20,480
QPOLDC1	SERVICE PROGRAM	20,480	1	20,480	20,480
QRNXDUMP	SERVICE PROGRAM	20,480	1	20,480	20,480
QSPDSPFX	PROGRAM	20,480	1	20,480	20,480
QWCSHUIC	PROGRAM	20,480	1	20,480	20,480
D7A7822472000000	MODUL2 STATIC STORE	16,384	1	16,384	16,384
EEE05252CB000000	MODUL2 STATIC STORE	16,384	1	16,384	16,384
PF132 PEXTRACSTS	COMPOSITE PIECE - DATA SPACE	16,384	1	16,384	16,384
QATOCLS1 SERVICES	DATA BASE FILE MEMBER	16,384	1	16,384	16,384
QATOCTCPIPCONFIG	COMPOSITE PIECE - DATA SPACE	16,384	1	16,384	16,384
QCACHLBL	PROGRAM	16,384	1	16,384	16,384
QCAPLIST	TEMPORARY - SPACE	16,384	4	4,096	4,096
QSO_DNS_INDEX	TEMPORARY - INDEX	16,384	1	16,384	16,384
QSPDEVQ	PRINT QUEUE	16,384	1	16,384	16,384
QSPFACB	FILE AVAIL CTL BLOCK	16,384	1	16,384	16,384
QSPFRMQ	PRINT QUEUE	16,384	1	16,384	16,384
QSPQJBQ	PRINT QUEUE	16,384	1	16,384	16,384
QSPUDTQ	PRINT QUEUE	16,384	1	16,384	16,384
QSQENDAG	PROGRAM	16,384	1	16,384	16,384
QSYCPYIP	PROGRAM	16,384	1	16,384	16,384
QUIRCLAP	PROGRAM	16,384	1	16,384	16,384
QWCCDSACORDERINDEX	TEMPORARY - INDEX	16,384	1	16,384	16,384
QWCDLYJB	PROGRAM	16,384	1	16,384	16,384
QWTMMRLJ	PROGRAM	16,384	1	16,384	16,384
QWTPMHDJ	PROGRAM	16,384	1	16,384	16,384
Q04079N002Q097276464	COMPOSITE PIECE - DATA SPACE	16,384	1	16,384	16,384
D56C3B528F000000	HEAP CONTROL SEGMENT	12,288	1	12,288	12,288
QATOCTCPIPCONFIG	COMPOSITE PIECE - DATA SPACE INDEX	12,288	1	12,288	12,288

Figure 136 (Part 4 of 5). Object/Segment Sizes, Grouped by Name and Description

Object/Segment name and description		Total size summed seg/obj (in bytes)	Num of obj or segs	Average size	Maximum size
QCASQ	TEMPORARY - QUEUE	12,288	1	12,288	12,288
QLDA	LOCAL DATA AREA	12,288	3	4,096	4,096
QWVPDAGE	PROGRAM	12,288	1	12,288	12,288
	TEMPORARY - SPACE	8,192	2	4,096	4,096
CA4A7FFD57000000	MWS AREA CTL SID	8,192	1	8,192	8,192
FCAE14909A000000	MWS AREA CTL SID	8,192	1	8,192	8,192
FE38ECDB80040000	TOMBSTONE SEGMENT	8,192	1	8,192	8,192
QATOCTCPIPCONFIG	DATA BASE FILE MEMBER	8,192	1	8,192	8,192
QA1ANET QA1ANET	DATA BASE FILE MEMBER	8,192	1	8,192	8,192
QHST	MESSAGE QUEUE	8,192	1	8,192	8,192
WMHQ Data Queue Cach	TEMPORARY - SPACE	8,192	1	8,192	8,192
APLIST	TEMPORARY - SPACE	4,096	1	4,096	4,096
CPYSPLF	COMMAND	4,096	1	4,096	4,096
DSPOBJD	FILE	4,096	1	4,096	4,096
DSPOBJD DSPOBJD	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
ENDPEX	COMMAND	4,096	1	4,096	4,096
E33ADE8230040000	ACCESS GROUP	4,096	1	4,096	4,096
FF631683D0040000	ACCESS GROUP	4,096	1	4,096	4,096
PF01	FILE	4,096	1	4,096	4,096
PF01 PF01	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
PF02	FILE	4,096	1	4,096	4,096
PF02 PF02	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
PF03	FILE	4,096	1	4,096	4,096
PF03 PF03	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
PF04	FILE	4,096	1	4,096	4,096
PF04 PF04	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
PF05	FILE	4,096	1	4,096	4,096
PF05 PF05	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
PF132	FILE	4,096	1	4,096	4,096
PF132 PEXTRACSTS	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
QATOCTCPIP	FILE	4,096	1	4,096	4,096
QATTR	FILE FORMAT	4,096	1	4,096	4,096
QHST96213D	FILE	4,096	1	4,096	4,096
QHST96213DQHST96213D	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
QMAIR	TEMPORARY - SPACE	4,096	1	4,096	4,096
QPDSPSTS	FILE	4,096	1	4,096	4,096
QSNADS	SUBSYSTEM DESCRIPTION	4,096	1	4,096	4,096
QTCPASC	TABLE	4,096	1	4,096	4,096
Object/Segment name and description		Total size summed seg/obj (in bytes)	Num of obj or segs	Average size	Maximum size
Q04079N001QSPL	DATA BASE OPERATIONAL CURSOR	4,096	1	4,096	4,096
Q04079N002Q097276464	DATA BASE FILE MEMBER	4,096	1	4,096	4,096
RLSJOB	COMMAND	4,096	1	4,096	4,096

* * * E N D O F R E P O R T * * *

Figure 136 (Part 5 of 5). Object/Segment Sizes, Grouped by Name and Description

10.7.3 Report Title-Object/Segment Sizes, Grouped by Object/Segment Type (Description) Only

```
                    Object/Segment sizes, grouped by obj/seg type (description) only
                          QUERY NAME . . . . . OBJSIZ8
                          LIBRARY NAME . . . . SMTRACE
                          FILE         LIBRARY      MEMBER       FORMAT
                          OBJSIZ7      PFREXP2      PEXTRACE     OBJSIZ7
                          DATE . . . . . . . . 08/02/96
                          TIME . . . . . . . . 19:06:44
```

Object/Segment name	Total size summed seg/obj (in bytes)	Num of obj or segs	Average size	Maximum size	Minimum size
	7,282,597,888	232	31,390,508	6,288,281,600	4,096
TEMPORARY - PROCESS CTL SPACE	7,176,609,792	4	1,794,152,448	6,288,281,600	3,178,496
L/L RANGE 1	44,040,192	3	14,680,064	16,777,216	10,485,760
WORK CONTROL BLOCK TABLE	11,800,576	1	11,800,576	11,800,576	11,800,576
COMPOSITE PIECE - DATA SPACE	8,548,352	10	854,835	6,529,024	16,384
MESSAGE FILE	7,872,512	2	3,936,256	7,610,368	262,144
OIR SPACE	7,217,152	1	7,217,152	7,217,152	7,217,152
SERVICE PROGRAM	5,029,888	21	239,518	1,126,400	20,480
USER PROFILE	4,907,008	5	981,402	1,773,568	94,208
MWS AREA DATA SID	3,293,184	5	658,637	1,851,392	65,536
PROGRAM	3,014,656	50	60,293	229,376	12,288
CCSID INFORMATION OBJECT	1,990,656	1	1,990,656	1,990,656	1,990,656
MESSAGE QUEUE	1,232,896	2	616,448	1,224,704	8,192
SEIZE LOCK RANGE	1,220,608	1	1,220,608	1,220,608	1,220,608
HEAP DATA SEGMENT TYPE	1,003,520	6	167,253	344,064	73,728
LIBRARY	811,008	5	162,202	536,576	28,672
COMPOSITE PIECE - INDEX	663,552	1	663,552	663,552	663,552
	532,480	1	532,480	532,480	532,480
JOB MESSAGE QUEUE	528,384	6	88,064	280,576	20,480
MUTEX TEMP SEGMENT	409,600	1	409,600	409,600	409,600
TEMPORARY - SPACE	339,968	26	13,076	98,304	4,096
TEMPORARY - ACCESS GROUP	258,048	1	258,048	258,048	258,048
PRINT QUEUE	208,896	5	41,779	143,360	16,384
PANEL GROUP DEFINITION	204,800	2	102,400	135,168	69,632
TOMBSTONE SEGMENT	163,840	4	40,960	65,536	8,192
ACTIVATION PROC REF TBL	131,072	2	65,536	65,536	65,536
TEMPORARY - INDEX	81,920	4	20,480	24,576	16,384
PROTECTED SPACE	69,632	11	6,330	8,192	4,096
DATA BASE FILE MEMBER	69,632	12	5,803	16,384	4,096
INTERNAL QTEMP LIBRARY	49,152	1	49,152	49,152	49,152
FILE	40,960	10	4,096	4,096	4,096
DATA BASE IN-USE TBL	36,864	1	36,864	36,864	36,864
MODUL2 STATIC STORE	32,768	2	16,384	16,384	16,384
SPOOL CTL BLOCK	24,576	5	4,915	8,192	4,096
OUTPUT QUEUE	20,480	1	20,480	20,480	20,480
INTERACTIVE PROFILE	20,480	1	20,480	20,480	20,480
MWS AREA CTL SID	16,384	2	8,192	8,192	8,192
FILE AVAIL CTL BLOCK	16,384	1	16,384	16,384	16,384

Object/Segment name	Total size summed seg/obj (in bytes)	Num of obj or segs	Average size	Maximum size	Minimum size
TEMPORARY - QUEUE	12,288	1	12,288	12,288	12,288
LOCAL DATA AREA	12,288	3	4,096	4,096	4,096
HEAP CONTROL SEGMENT	12,288	1	12,288	12,288	12,288
COMPOSITE PIECE - DATA SPACE INDEX	12,288	1	12,288	12,288	12,288
COMMAND	12,288	3	4,096	4,096	4,096
ACCESS GROUP	8,192	2	4,096	4,096	4,096
TABLE	4,096	1	4,096	4,096	4,096
SUBSYSTEM DESCRIPTION	4,096	1	4,096	4,096	4,096
FILE FORMAT	4,096	1	4,096	4,096	4,096
DATA BASE OPERATIONAL CURSOR	4,096	1	4,096	4,096	4,096

```
* * *  E N D  O F  R E P O R T  * * *
```

Figure 137. Object/Segment Sizes, Grouped by Obj/Seg Type (Description) Only

10.8 CPU Utilization - Print PEX CPU % Report (PRTPEXCPUB Command)

This section provides an example of the report you can produce using this command.

Please refer to Section 6.6.8, “CPU Reporting Command” on page 162 for a details of how to use the PRTPEXCPUB command to produce this reports.

Refer to Table 13 on page 168 for details of the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

In this report, the *LIC task id* is listed first. If this task ID was a LIC only task, the task name is listed second. If this task ID was an OS/400 job, the OS/400 job name is listed second. We have omitted several print lines (time stamps) for most task IDs that showed no CPU activity (not even a single asterisk (*)) to reduce the number of pages shown in this sample report. Even so, the listing is quite long. Use the number of * characters to the right of the *CPU%* value to more easily identify jobs or LIC tasks that take more CPU than other listed in these examples.

Each asterisk character represents 1% of CPU utilization. For example, twelve astrisks (**********) indicate 12% CPU utilization.

No significant CPU activity occurs until task ID **0007F6C - job P23ARTVKE/A960126A/053319**.

10.8.1 Report Title - Performance Explorer CPU Utilization Report

```
                                    Performance Explorer CPU Utilization Report
Member name . . . . . : PEXTRACE
Library name. . . . . : PFREXP2
System name . . . . . : RCHASM05
System type . . . . . : 9406
System model. . . . . : 510
System VRM  . . . . . : V3R6M0
Session start . . . . . : 1996-08-02-16.07.22.286408
Session stop. . . . . : 1996-08-02-16.12.29.217888
Session CPU utilization : 30%
Number of processors    : 1
------------------------------------------------------------------------------------------------------------------------------------
Task ID: 0000004C Name:               SMSIGNALEVENT        CPU % of Session: 0.004%     CPU % of Job existence: 0.004%
Timestamp        CPU%   Histogram
------------------------------------------------------------------------------------------------------------------------------------
16.07.31.265528    0%:
------------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000055 Name:               RMTMSAFETASK         CPU % of Session: 0.004%     CPU % of Job existence: 0.005%
Timestamp        CPU%   Histogram
------------------------------------------------------------------------------------------------------------------------------------
16.08.17.875776    0%:
16.09.26.474616    0%:
------------------------------------------------------------------------------------------------------------------------------------
Task ID: 0000005F Name:               SMAIO001             CPU % of Session: 0.078%     CPU % of Job existence: 0.078%
Timestamp        CPU%   Histogram
------------------------------------------------------------------------------------------------------------------------------------
16.07.42.927456    0%:
------------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000060 Name:               SMAIO002             CPU % of Session: 0.702%     CPU % of Job existence: 0.707%
Timestamp        CPU%   Histogram
------------------------------------------------------------------------------------------------------------------------------------
16.08.19.365448    0%:
16.08.45.394736    0%:
16.09.18.480600    0%:
16.09.41.793856    0%:
16.10.30.047296    0%:
16.10.44.127656    1%:  *
16.11.14.734056    0%:
16.11.35.901568    0%:
16.11.55.328424    1%:  *
16.12.17.010728    0%:
------------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000061 Name:               SMAIO003             CPU % of Session: 0.122%     CPU % of Job existence: 0.122%
Timestamp        CPU%   Histogram
------------------------------------------------------------------------------------------------------------------------------------
16.07.42.989216    0%:
------------------------------------------------------------------------------------------------------------------------------------
```

```
Task ID: 00000063 Name:              SMAIOOO5             CPU % of Session: 0.658%     CPU % of Job existence: 0.662%
Timestamp        CPU%   Histogram
                                              MO5


-------------------------------------------------------------------------------------------------------------------------------
16.07.44.037904    0%:
16.08.12.371752    0%:
16.08.41.691264    0%:
16.09.09.007288    0%:
16.09.51.929224    0%:
16.10.21.911920    0%:
16.11.02.986192    0%:
16.11.43.212720    0%:
16.12.14.367576    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000065 Name:              SMAIOOO7             CPU % of Session: 0.644%     CPU % of Job existence: 0.649%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.42.082040    1%:  *
16.08.04.316680    0%:
16.08.33.517640    0%:
16.09.02.282504    0%:
16.09.38.745960    0%:
16.10.02.767640    0%:
16.10.41.012728    0%:
16.11.01.680032    0%:
16.12.02.056848    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000066 Name:              SMPOOOO1             CPU % of Session: 0.641%     CPU % of Job existence: 0.645%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.36.455376    0%:
16.07.37.470544    0%:
16.07.38.483392    0%:
16.07.39.774848    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.08.38.769096    0%:
16.08.39.900136    1%:  *
16.08.40.974024    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.00.323488    0%:
16.09.01.499424    1%:  *
16.09.02.773640    0%:
16.09.04.173632    0%:
16.09.05.174680    0%:
16.09.06.292424    0%:
                                              MO5


16.09.07.457920    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.25.953096    0%:
16.09.26.960072    0%:
16.09.27.983696    1%:  *
16.09.29.191016    0%:
16.09.30.394816    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.03.052576    0%:
16.10.04.082400    0%:
16.10.05.082480    1%:  *
16.10.06.085288    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.40.434080    0%:
16.10.41.686936    0%:
16.10.42.724608    0%:
16.10.43.727936    1%:  *
16.10.45.048272    0%:
16.10.46.268936    0%:
16.10.47.760600    0%:
16.10.48.762688    0%:
16.10.50.114792    0%:
16.10.51.260680    0%:
16.10.52.302992    0%:
16.10.53.304856    1%:  *
16.10.54.491216    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.23.215696    0%:
16.11.24.349552    1%:  *
16.11.25.597464    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.39.444856    0%:
16.11.40.529800    1%:  *
16.11.41.651456    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.52.658032    1%:  *
16.11.53.984248    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.27.000056    0%:
16.12.28.274688    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000067 Name:              SMPOOOO2             CPU % of Session: 0.640%     CPU % of Job existence: 0.645%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.36.451440    0%:
16.07.37.470360    0%:
16.07.38.483200    0%:
```

```
16.07.40.032304    0%:
16.07.41.658304    0%:
16.07.42.692336    1%:  *
16.07.43.692472    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.08.39.387064    0%:
16.08.40.544664    0%:
16.08.41.614864    1%:  *
16.08.42.624416    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.11.910248    0%:
16.09.12.970648    1%:  *
16.09.13.976408    0%:
16.09.15.013208    0%:
16.09.16.043800    0%:
16.09.17.046360    1%:  *
16.09.18.052320    0%:
16.09.19.279680    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.

16.09.30.297552    0%:
16.09.31.461384    1%:  *
16.09.32.747144    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.00.222584    0%:
16.10.01.223248    0%:
16.10.02.281472    1%:  *
16.10.03.372040    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.56.772592    0%:
16.10.57.775552    1%:  *
16.10.58.779808    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.19.103840    0%:
16.11.20.105408    1%:  *
16.11.21.172240    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.26.204360    0%:
16.12.27.267160    0%:
16.12.28.471168    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: OOOOO068 Name:               SMPOOOO3             CPU % of Session: 0.664%     CPU % of Job existence: 0.669%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.36.456872    0%:
16.07.37.468368    0%:
16.07.38.481944    0%:
16.07.39.878000    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.07.50.847848    0%:
16.07.52.028184    1%:  *
16.07.53.248200    0%:
16.07.54.322856    0%:
16.07.55.451064    0%:
16.07.56.475200    0%:
16.07.57.490712    0%:
16.07.58.987128    0%:
16.08.00.338592    0%:
16.08.01.942808    0%:
16.08.03.240936    1%:  *
16.08.04.363968    0%:
16.08.05.384296    0%:
16.08.06.804192    0%:
16.08.08.100656    0%:
16.08.09.289648    0%:
16.08.10.301208    0%:
16.08.11.337224    0%:
16.08.12.339992    0%:
16.08.13.480344    0%:
16.08.14.502336    1%:  *
16.08.15.591736    0%:
16.08.16.688336    0%:
16.08.18.182360    0%:
16.08.19.201200    0%:
16.08.20.361064    0%:
16.08.21.368264    0%:
16.08.22.639040    0%:
16.08.23.898152    0%:
16.08.24.972544    0%:
16.08.26.021576    0%:
16.08.27.030744    0%:
16.08.28.063768    1%:  *
16.08.29.116624    0%:
16.08.30.205656    0%:
16.08.31.285560    1%:  *
16.08.32.677192    0%:
16.08.33.914760    0%:
16.08.35.088624    1%:  *
16.08.36.225520    0%:
16.08.37.486808    0%:
16.08.38.667608    0%:
16.08.39.775592    1%:  *
16.08.40.808648    0%:
16.08.41.927464    0%:
16.08.43.143592    0%:
16.08.44.215528    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.16.645080    0%:
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16.09.17.867968    1%:  *
16.09.19.009280    0%:
16.09.20.045160    0%:
16.09.21.165848    0%:
16.09.22.658400    0%:
16.09.24.746128    0%:
16.09.26.729280    0%:
16.09.27.952952    1%:  *
16.09.29.366792    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.51.026016    0%:
16.09.52.040656    0%:
16.09.53.116480    1%:  *
16.09.54.391968    0%:
16.09.55.743640    0%:
16.09.56.942464    0%:
16.09.57.949728    0%:
16.09.59.246968    0%:
16.10.00.292296    1%:  *
16.10.01.327824    0%:
16.10.16.789576    1%:  *
16.10.17.843504    0%:
16.10.18.903976    0%:
16.10.20.332896    0%:
16.10.21.564480    0%:
16.10.22.583296    1%:  *
16.10.23.953736    0%:
16.10.24.982704    1%:  *
16.10.26.379240    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.51.714448    0%:
16.10.52.797104    1%:  *
16.10.54.000048    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.21.150568    0%:
16.11.22.180488    1%:  *
16.11.23.193904    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.52.059576    1%:  *
16.11.53.241936    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.25.695168    0%:
16.12.26.699824    1%:  *
16.12.27.874400    0%:
16.12.28.935288    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000069 Name:               SMP0000004             CPU % of Session: 0.671%     CPU % of Job existence: 0.676%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.36.458752    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.08.40.736600    0%:
16.08.41.920056    1%:  *
16.08.43.035216    0%:
16.08.44.334648    0%:
16.08.45.500160    0%:
16.08.46.520816    0%:
16.08.47.724496    0%:
16.08.48.726752    0%:
16.08.50.368752    0%:
16.08.51.394272    0%:
16.08.52.430744    0%:
16.08.53.739640    0%:
16.08.54.902040    0%:
16.08.55.915136    1%:  *
16.08.56.920528    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.11.144344    0%:
16.09.12.144384    1%:  *
16.09.13.155280    1%:  *
16.09.14.347672    0%:
16.09.15.728032    0%:
16.09.16.745008    1%:  *
16.09.17.797392    0%:
16.09.19.160384    0%:
16.09.20.369944    1%:  *
16.09.23.672656    0%:
16.09.25.066960    0%:
16.09.26.601976    0%:
16.09.27.918480    1%:  *
16.09.29.201640    0%:
16.09.30.295848    0%:
16.09.31.462984    1%:  *
16.09.42.797088    0%:
16.09.44.034296    1%:  *
16.09.45.048776    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.05.083552    0%:
16.10.06.114576    1%:  *
16.10.07.305800    0%:
16.10.08.533568    0%:
16.10.09.539960    1%:  *
16.10.10.816904    0%:
16.10.11.818816    0%:
16.10.12.864720    0%:
16.10.13.883056    0%:
16.10.15.276592    0%:
16.10.16.278656    0%:
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16.10.17.297480    0%:
16.10.18.576928    0%:
16.10.19.577128    1%:  *
16.10.20.697408    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.32.982472    0%:
16.10.33.990272    1%:  *
16.10.34.992728    0%:
16.10.35.992840    0%:
16.10.37.106960    0%:
16.10.38.107104    0%:
16.10.39.124168    0%:
16.10.40.155520    0%:
16.10.41.681448    0%:
16.10.42.721832    0%:
16.10.43.727560    0%:
16.10.44.727576    1%:  *
16.10.45.996280    0%:
16.10.47.174360    0%:
16.10.48.199848    0%:
16.10.49.377648    0%:
16.10.50.379216    0%:
16.10.51.440312    0%:
16.10.52.609072    1%:  *
16.10.53.804456    0%:
16.10.54.805808    1%:  *
16.10.55.919536    0%:
16.10.56.939184    0%:
16.10.57.954888    0%:
16.10.58.959152    1%:  *
16.11.00.259760    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.17.945128    0%:
16.11.18.963640    1%:  *
16.11.20.004168    0%:
16.11.21.070696    0%:
16.11.22.212136    0%:
16.11.23.221016    0%:
16.11.24.292048    0%:
16.11.25.594320    0%:
16.11.26.633896    0%:
16.11.27.635216    1%:  *
16.11.28.647200    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.28.460280    0%:
-------------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000006A Name:               SMP00005             CPU % of Session: 0.635%     CPU % of Job existence: 0.639%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------------
16.07.36.459136    0%:
16.07.37.470736    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.07.57.492464    0%:
16.07.58.640920    1%:  *
16.07.59.651472    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.08.40.687416    0%:
16.08.41.736000    1%:  *
16.08.42.752216    1%:  *
16.08.44.118608    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.10.710200    0%:
16.09.12.009896    1%:  *
16.09.13.068040    1%:  *
16.09.14.089424    0%:
16.09.15.485544    0%:
16.09.16.658400    0%:
16.09.17.988320    1%:  *
16.09.19.144416    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.39.799664    1%:  *
16.09.41.092872    0%:
16.09.42.375936    0%:
16.09.43.394016    0%:
16.09.44.679952    1%:  *
16.09.45.871768    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.04.017704    0%:
16.10.05.088664    1%:  *
16.10.06.106896    1%:  *
16.10.07.259640    0%:
16.10.08.530552    0%:
16.10.09.531792    0%:
16.10.10.553240    0%:
16.10.11.635704    0%:
16.10.12.650360    0%:
16.10.13.653416    1%:  *
16.10.14.690728    0%:
16.10.15.703536    0%:
16.10.17.157528    0%:
16.10.18.502704    0%:
16.10.19.663024    0%:
16.10.20.700984    0%:
16.10.21.768816    0%:
16.10.23.131856    0%:
16.10.24.150008    1%:  *
16.10.25.221784    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
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16.10.44.622264    0%:
16.10.45.660680    0%:
16.10.46.843704    1%:  *
16.10.48.108232    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.35.221440    0%:
16.11.36.285112    0%:
16.11.37.301336    1%:  *
16.11.38.315144    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.51.059360    0%:
16.11.52.076424    1%:  *
16.11.53.246000    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.08.569616    0%:
16.12.09.573264    1%:  *
16.12.10.576104    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.28.688016    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000006B Name:               SMP00006             CPU % of Session: 0.683%     CPU % of Job existence: 0.687%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------

16.07.36.434112    0%:
16.07.37.468904    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.08.18.213928    0%:
16.08.19.219376    1%:  *
16.08.20.822176    0%:
16.08.21.863416    1%:  *
16.08.22.902952    0%:
16.08.23.903528    0%:
16.08.25.154200    0%:
16.08.26.411864    1%:  *
16.08.27.599272    0%:
16.08.28.801520    0%:
16.08.30.207312    0%:
16.08.31.235880    0%:
16.08.32.369496    0%:
16.08.33.370992    0%:
16.08.34.885160    0%:
16.08.36.133232    0%:
16.08.37.322072    0%:
16.08.38.391096    1%:  *
16.08.39.551552    0%:
                                              M05


16.08.40.560352    1%:  *
16.08.41.808416    1%:  *
16.08.42.997056    0%:
16.08.44.369280    0%:
16.08.45.382400    0%:
16.08.46.735880    0%:
16.08.47.740152    1%:  *
16.08.49.366096    0%:
16.08.50.394504    0%:
16.08.51.396736    0%:
16.08.52.585728    0%:
16.08.53.750064    0%:
16.08.54.899808    0%:
16.08.55.902568    1%:  *
16.08.56.916096    0%:
16.08.57.919520    1%:  *
16.08.59.327480    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.11.153424    0%:
16.09.12.176784    1%:  *
16.09.13.199872    0%:
16.09.14.415856    0%:
16.09.15.637384    0%:
16.09.16.683024    0%:
16.09.17.747080    1%:  *
16.09.19.124264    0%:
16.09.20.310528    0%:
16.09.21.961744    0%:
16.09.24.156648    0%:
16.09.25.209912    0%:
16.09.26.616744    0%:
16.09.27.713936    0%:
16.09.28.716144    0%:
16.09.29.722008    1%:  *
16.09.30.927656    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.44.030568    0%:
16.09.45.047928    1%:  *
16.09.46.399608    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.09.471048    0%:
16.10.10.489096    1%:  *
16.10.11.601936    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.50.117160    0%:
16.10.51.118432    1%:  *
16.10.52.247360    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
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16.11.19.096208    0%:
16.11.20.120920    1%:  *
16.11.21.148896    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.56.720376    0%:
16.11.57.775592    0%:
16.11.58.884456    0%:
16.11.59.898880    1%:  *
16.12.01.121360    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.27.217784    0%:
16.12.28.460776    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 0000006C Name:               SMP00007             CPU % of Session: 0.628%     CPU % of Job existence: 0.632%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.36.453608    0%:
16.07.37.467880    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.07.50.852848    0%:
16.07.51.876888    1%:  *
16.07.52.897632    0%:
16.07.54.111760    0%:
16.07.55.349136    0%:
16.07.56.353248    1%:  *
16.07.57.443344    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.08.22.428232    0%:
16.08.23.435904    1%:  *
16.08.24.607568    0%:
16.08.25.639000    0%:
16.08.26.875656    0%:
16.08.27.918584    1%:  *
16.08.29.098672    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.08.39.538272    0%:
16.08.40.693792    1%:  *
16.08.41.809536    0%:
16.08.42.810704    1%:  *
16.08.44.119584    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.00.604680    0%:
16.09.01.677968    1%:  *
16.09.02.777488    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.26.615776    0%:
16.09.27.951696    1%:  *
16.09.29.350424    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.09.41.608888    0%:
16.09.42.625704    1%:  *
16.09.43.900528    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.10.15.033400    0%:
16.10.16.308952    1%:  *
16.10.17.318272    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.28.830176    0%:
16.11.30.022352    1%:  *
16.11.31.036512    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.20.949080    0%:
16.12.22.073904    1%:  *
16.12.23.154568    0%:
16.12.24.323728    0%:
16.12.25.553600    0%:
16.12.26.829232    0%:
16.12.27.867472    0%:
16.12.28.917424    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000092 Name:               SMXCSPRVSR           CPU % of Session: 0.007%     CPU % of Job existence: 0.007%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.42.742048    0%:
16.08.23.137464    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.12.25.563176    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 000000EC Name:   SCPF       QSYS       000000     CPU % of Session: 0.007%     CPU % of Job existence: 0.007%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.46.609392    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00000116 Name:               SK-ASC007P           CPU % of Session: 0.014%     CPU % of Job existence: 0.014%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.47.950424    0%:
**** >> SEVERAL TIME STAMPS WITH NO CPU % OMITTED FROM ORIGINAL REPORT, STARTING HERE.
16.11.50.595120    0%:


-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00007F03 Name:   QCMN       QSYS       053251     CPU % of Session: 0.000%     CPU % of Job existence: 0.000%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.09.27.091544    0%:
-------------------------------------------------------------------------------------------------------------------------------
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Task ID: 00007F0B Name:   QSERVER    QSYS       053254     CPU % of Session: 0.001%     CPU % of Job existence: 0.001%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.09.27.318712    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00007F2E Name:   QBRMNET    QPGMR      053289     CPU % of Session: 0.020%     CPU % of Job existence: 0.020%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.08.17.883752    0%:
16.09.20.855680    0%:
16.10.23.833608    0%:
16.11.26.798168    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00007F35 Name:   QESTP      QSRVBAS    053296     CPU % of Session: 0.001%     CPU % of Job existence: 0.001%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.12.05.857056    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00007F37 Name:   QTGTELNETS QTCP       053298     CPU % of Session: 0.004%     CPU % of Job existence: 0.004%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.08.52.888944    0%:
16.10.55.773128    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00007F6C Name:   P23ARTVKE  A960126A   053319     CPU % of Session: 0.403%     CPU % of Job existence: 0.403%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.24.514664    1%:  *
16.07.25.519104    7%:  *******
16.07.32.995792    1%:  *
16.07.34.004104    3%:  ***
16.07.35.020552    3%:  ***
16.07.36.027456    3%:  ***
16.07.37.044608    2%:  **
16.07.38.052424    2%:  **
16.07.39.073576    1%:  *
16.07.40.074296    2%:  **
16.07.41.076480    2%:  **
16.07.42.081784    2%:  **
16.07.43.089000    2%:  **
16.07.44.103208    2%:  **
16.07.45.110952    2%:  **
16.07.46.126056    1%:  *


16.07.47.978576    1%:  *
16.07.48.978608   13%:  *************
16.07.50.456168    2%:  **
16.07.55.114912    3%:  ***
16.07.57.190848    7%:  *******
16.08.03.379680    0%:
16.08.06.067032    0%:
16.08.10.519888    0%:
16.08.11.747880    0%:
16.08.13.502504    0%:
16.08.14.639896    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00008408 Name:   JUNK       QSPLJOB    053464     CPU % of Session: 1.130%     CPU % of Job existence: 1.131%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.36.431488    0%:
16.07.37.444000    4%:  ****
16.07.38.457224    3%:  ***
16.07.39.481392    2%:  **
16.07.40.494712    2%:  **
16.07.41.510208    2%:  **
16.07.42.513984    2%:  **
16.07.43.522536    2%:  **
16.07.44.528352    3%:  ***
16.07.45.551296    2%:  **
16.07.46.552120    3%:  ***
16.07.47.567680    2%:  **
16.07.48.567976    1%:  *
16.07.49.587576    2%:  **
16.07.50.674432    1%:  *
16.07.51.677456    3%:  ***
16.07.52.683952    2%:  **
16.07.53.723432    2%:  **
16.08.26.387088    0%:
16.08.27.387568    3%:  ***
16.08.28.403608    3%:  ***
16.08.29.414056    3%:  ***
16.08.30.434912    3%:  ***
16.08.31.512272    2%:  **
16.08.32.516248    3%:  ***
16.08.33.521536    3%:  ***
16.08.34.550704    2%:  **
16.08.35.570808    3%:  ***
16.08.36.570824    2%:  **
16.08.37.667056    2%:  **
16.08.38.676344    2%:  **
16.08.39.719064    3%:  ***
16.08.40.724920    3%:  ***
16.08.41.736392    2%:  **
16.08.42.790872    1%:  *
16.09.15.391736    0%:
16.09.16.392496    4%:  ****
```

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16.09.17.406096    4%:  ****
16.09.18.417136    3%:  ***
                                                  MO5


16.09.19.434560    3%:  ***
16.09.20.445152    2%:  **
16.09.21.542424    3%:  ***
16.09.22.543384    3%:  ***
16.09.23.545560    3%:  ***
16.09.24.553696    4%:  ****
16.09.25.555248    3%:  ***
16.09.26.576784    3%:  ***
16.09.27.679528    4%:  ****
16.09.28.690408    2%:  **
16.09.29.707728    2%:  **
16.10.02.547480    0%:
16.10.03.592560    3%:  ***
16.10.04.597624    4%:  ****
16.10.05.722408    2%:  **
16.10.06.728088    3%:  ***
16.10.07.768536    2%:  **
16.10.08.843392    3%:  ***
16.10.09.874592    2%:  **
16.10.10.876080    2%:  **
16.10.11.887336    3%:  ***
16.10.12.896960    3%:  ***
16.10.13.941216    1%:  *
16.10.15.030304    2%:  **
16.10.16.045408    4%:  ****
16.10.17.076656    2%:  **
16.10.18.079368    2%:  **
16.10.50.906936    0%:
16.10.51.918216    2%:  **
16.10.52.919832    5%:  *****
16.10.53.924496    2%:  **
16.10.54.933208    3%:  ***
16.10.55.959640    2%:  **
16.10.56.968504    3%:  ***
16.10.57.985112    2%:  **
16.10.59.010480    3%:  ***
16.11.00.033864    3%:  ***
16.11.01.052672    3%:  ***
16.11.02.068480    2%:  **
16.11.03.068864    3%:  ***
16.11.04.093440    3%:  ***
16.11.05.110728    2%:  **
16.11.06.140240    2%:  **
16.11.38.813320    0%:
16.11.39.860712    4%:  ****
16.11.40.914744    4%:  ****
16.11.41.943328    2%:  **
16.11.42.945840    3%:  ***
16.11.43.952120    2%:  **
16.11.44.952632    4%:  ****
16.11.45.955088    3%:  ***
16.11.46.966096    2%:  **
16.11.47.966560    3%:  ***
16.11.48.984968    3%:  ***
16.11.49.992528    1%:  *
                                                  MO5


16.11.51.026064    2%:  **
16.11.52.035744    4%:  ****
16.11.53.065080    2%:  **
16.11.54.124496    2%:  **
16.12.27.114928    0%:
16.12.28.124736    2%:  **
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00008808 Name:   PEXSBSD    QSYS       053539     CPU % of Session: 0.003%     CPU % of Job existence: 0.003%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.36.050544    0%:
16.07.41.012656    0%:
16.07.46.410704    0%:
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 0000880E Name:   ILEAGNEW   A960126A   053541     CPU % of Session: 5.272%     CPU % of Job existence: 5.273%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.36.118760    0%:
16.07.37.119904    4%:  ****
16.07.38.121320    5%:  *****
16.07.39.129808    3%:  ***
16.07.40.211168    5%:  *****
16.07.41.243392    4%:  ****
16.07.42.291824    4%:  ****
16.07.43.293112    5%:  *****

 (REMAINDER OF TASK ID 0000880E REMOVED FOR BREVITY.)

-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00008810 Name:   TSTIOC     A960126A   053543     CPU % of Session: 6.364%     CPU % of Job existence: 6.366%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.46.466752    0%:
16.07.47.472728    2%:  **
16.07.48.482888    4%:  ****
```

```
16.07.49.484872    5%:  *****
16.07.50.488400    4%:  ****
16.07.51.555576    1%:  *
16.07.52.623736    5%:  *****
16.07.53.700736    4%:  ****
16.07.54.798664    4%:  ****
16.07.55.805640    3%:  ***
16.07.56.818984    5%:  *****
16.07.57.835328    6%:  ******
16.07.58.860848    6%:  ******
16.07.59.876240    9%:  *********
16.08.00.892504    5%:  *****
16.08.01.895376    7%:  *******
16.08.02.917936    4%:  ****
16.08.03.923648    6%:  ******
16.08.04.946224    8%:  ********
16.08.05.947248    4%:  ****
16.08.06.973824    6%:  ******
16.08.07.986840    7%:  *******
16.08.08.994472    7%:  *******
16.08.10.002608    6%:  ******
16.08.11.003352    6%:  ******
16.08.12.003704    8%:  ********
16.08.13.004960   12%:  ************
                                                  M05

16.08.14.105864    6%:  ******
16.08.15.107016    9%:  *********
16.08.16.108272    9%:  *********
16.08.17.108440    4%:  ****
16.08.18.108544   10%:  **********
16.08.19.240168    6%:  ******
16.08.20.260896    4%:  ****
16.08.21.261056   12%:  ************
16.08.22.279792    4%:  ****
16.08.23.279872    6%:  ******
16.08.24.290016    4%:  ****
16.08.25.298200    6%:  ******
16.08.26.307952    6%:  ******
16.08.27.336992    5%:  *****
16.08.28.343232    7%:  *******
16.08.29.358496    8%:  ********
16.08.30.358648    5%:  *****
16.08.31.367936    4%:  ****
16.08.32.390712    5%:  *****
16.08.33.407800    4%:  ****
16.08.34.416096    5%:  *****
16.08.35.416768    4%:  ****
16.08.36.420016    4%:  ****
16.08.37.426776    7%:  *******
16.08.38.443056    5%:  *****
16.08.39.456656    4%:  ****
16.08.40.465144    5%:  *****
16.08.41.470464    6%:  ******
16.08.42.473880    5%:  *****
16.08.43.625320    4%:  ****
16.08.44.636720    5%:  *****
16.08.45.636824    5%:  *****
16.08.46.651792    5%:  *****
16.08.47.660728    4%:  ****
16.08.48.671328    5%:  *****
16.08.49.681888    6%:  ******
16.08.50.689264    5%:  *****
16.08.51.689696    7%:  *******
16.08.52.701168    7%:  *******
16.08.53.701504    4%:  ****
16.08.54.731240    4%:  ****
16.08.55.740416    5%:  *****
16.08.56.753168    4%:  ****
16.08.57.768192    5%:  *****
16.08.58.773816    6%:  ******
16.08.59.777336   10%:  **********
16.09.00.784240    4%:  ****
16.09.01.831304    5%:  *****
16.09.02.832856    5%:  *****
16.09.03.840120    8%:  ********
16.09.04.847792    6%:  ******
16.09.05.847872    6%:  ******
16.09.06.847968    8%:  ********
16.09.07.866240    6%:  ******
16.09.08.907232    3%:  ***
                                                  M05

16.09.09.934816    8%:  ********
16.09.10.935056    5%:  *****
16.09.11.950296    8%:  ********
16.09.12.985400    5%:  *****
16.09.13.989592    6%:  ******
16.09.14.991296    5%:  *****
16.09.16.016344    8%:  ********
16.09.17.056976    4%:  ****
16.09.18.082088    5%:  *****
16.09.19.114440    4%:  ****
16.09.20.122632    3%:  ***
16.09.21.122856    5%:  *****
16.09.22.122872   11%:  ***********
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16.09.23.132400   34%:  **********************************
16.09.24.132616   43%:  *******************************************
16.09.31.261048    0%:
16.09.32.307864    5%:  *****
16.09.33.362088    6%:  ******
16.09.34.393048    5%:  *****
16.09.35.404784    4%:  ****
16.09.36.434528    4%:  ****
16.09.37.435248    6%:  ******
16.09.38.435328    9%:  *********
16.09.39.439872    6%:  ******
16.09.40.440800    7%:  *******
16.09.41.440872    8%:  ********
16.09.42.448000    5%:  *****
16.09.43.454264    6%:  ******
16.09.44.465272    5%:  *****
16.09.45.540176    4%:  ****
16.09.46.551768    5%:  *****
16.09.47.558600    6%:  ******
16.09.48.566960    8%:  ********
16.09.49.580696    6%:  ******
16.09.50.583528    7%:  *******
16.09.51.610840    6%:  ******
16.09.52.620888    7%:  *******
16.09.53.687624    6%:  ******
16.09.54.688440    3%:  ***
16.09.55.700592    9%:  *********
16.09.56.706920    7%:  *******
16.09.57.720192    5%:  *****
16.09.58.733080    5%:  *****
16.09.59.739032    5%:  *****
16.10.00.752040    5%:  *****
16.10.01.757064    6%:  ******
16.10.02.757216    6%:  ******
16.10.03.759528    4%:  ****
16.10.04.760736    6%:  ******
16.10.05.784072    4%:  ****
16.10.06.805920    5%:  *****
16.10.07.819864    5%:  *****
16.10.08.826128    4%:  ****
16.10.09.833816    3%:  ***
16.10.10.866184    4%:  ****
16.10.11.880800    5%:  *****
16.10.12.907840    3%:  ***
16.10.13.920400    6%:  ******
16.10.14.941992    4%:  ****
16.10.15.972320    4%:  ****
16.10.17.049064    5%:  *****
16.10.18.077208    2%:  **
16.10.19.087032    3%:  ***
16.10.20.114856    4%:  ****
16.10.21.115072    4%:  ****
16.10.22.120096    7%:  *******
16.10.23.132624    4%:  ****
16.10.24.168320    4%:  ****
16.10.25.172008    4%:  ****
16.10.26.172664    4%:  ****
16.10.27.182968    4%:  ****
16.10.28.191448    6%:  ******
16.10.29.200280    7%:  *******
16.10.30.213928    7%:  *******
16.10.31.234488    4%:  ****
16.10.32.247104    6%:  ******
16.10.33.251184    7%:  *******
16.10.34.253552    4%:  ****
16.10.35.255464    5%:  *****
16.10.36.286656    6%:  ******
16.10.37.303960    5%:  *****
16.10.38.316544    5%:  *****
16.10.39.329456    5%:  *****
16.10.40.331336    7%:  *******
16.10.41.343568    4%:  ****
16.10.42.371984    6%:  ******
16.10.43.379976    8%:  ********
16.10.44.380888    7%:  *******
16.10.45.388616    6%:  ******
16.10.46.403712    4%:  ****
16.10.47.404952    8%:  ********
16.10.48.411496    8%:  ********
16.10.49.411608   10%:  **********
16.10.50.423952    7%:  *******
16.10.51.442528    5%:  *****
16.10.52.442584    3%:  ***
16.10.53.487640    4%:  ****
16.10.54.490752    4%:  ****
16.10.55.500000    4%:  ****
16.10.56.507008    2%:  **
16.10.57.508160    5%:  *****
16.10.58.517328    4%:  ****
16.10.59.518928    4%:  ****
16.11.00.547952   10%:  **********
16.11.01.549360   10%:  **********
16.11.02.549800   11%:  ***********
16.11.03.561016   11%:  ***********
16.11.04.561080   10%:  **********
16.11.05.586760    6%:  ******
16.11.06.651744    3%:  ***
16.11.07.652496    4%:  ****
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16.11.08.683600    5%:  *****
16.11.09.688544    8%:  ********
16.11.10.698512   12%:  ************
16.11.11.700904    8%:  ********
16.11.12.755144   10%:  **********
16.11.13.762312    8%:  ********
16.11.14.763576    6%:  ******
16.11.15.767376    5%:  *****

 (REMAINDER OF TASK ID 0000880E REMOVED FOR BREVITY.)
-------------------------------------------------------------------------------------------------------------------------------
Task ID: 00008814 Name:   OPENBAD    A960126A   053546     CPU % of Session: 6.384%     CPU % of Job existence: 6.385%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------------
16.07.41.050520    0%:
16.07.42.070640    4%:  ****
16.07.43.080536    6%:  ******
16.07.44.102864    5%:  *****
16.07.45.108144    5%:  *****
16.07.46.133952    7%:  *******
16.07.47.174776    6%:  ******
16.07.48.177752    6%:  ******
16.07.49.185296    6%:  ******
16.07.50.220352    6%:  ******
16.07.51.273392    8%:  ********
16.07.52.278640    7%:  *******
16.07.53.287144    8%:  ********
16.07.54.298456    7%:  *******
16.07.55.302208    7%:  *******
16.07.56.328400    4%:  ****
16.07.57.331128    6%:  ******
16.07.58.342120    7%:  *******
16.07.59.350696    9%:  *********
16.08.00.350832    7%:  *******
16.08.01.356288    8%:  ********
16.08.02.357560    8%:  ********
16.08.03.367832    7%:  *******
16.08.04.397480    9%:  *********
16.08.05.407104    5%:  *****
16.08.06.420104    6%:  ******
16.08.07.422184    8%:  ********
16.08.08.428888    7%:  *******
16.08.09.446472    6%:  ******
16.08.10.446632    7%:  *******
                                                  M05

16.08.11.456840    8%:  ********
16.08.12.469776    9%:  *********
16.08.13.477544    6%:  ******
16.08.18.293464    0%:
16.08.19.332280    6%:  ******
16.08.20.333576    8%:  ********
16.08.21.341280    9%:  *********
16.08.22.342696    9%:  *********
16.08.23.380192    9%:  *********
16.08.24.413744    6%:  ******
16.08.25.424232    8%:  ********
16.08.26.446352    9%:  *********
16.08.27.447368    5%:  *****
16.08.28.449056    6%:  ******
16.08.29.449760    7%:  *******
16.08.30.456640    8%:  ********
16.08.31.460928    8%:  ********
16.08.32.463152    8%:  ********
16.08.33.470400    7%:  *******
16.08.34.475008    7%:  *******
16.08.35.493376    7%:  *******
16.08.36.504096    5%:  *****
16.08.37.504184    8%:  ********
16.08.38.508952    8%:  ********
16.08.39.533720    8%:  ********
16.08.40.535520    6%:  ******
16.08.41.566160    8%:  ********
16.08.42.573800    7%:  *******
16.08.43.576840    8%:  ********
16.08.44.577344    7%:  *******
16.08.45.632728    7%:  *******
16.08.46.633136    6%:  ******
16.08.47.636792    7%:  *******
16.08.52.291600    0%:
16.08.53.295192    6%:  ******
16.08.54.306032    8%:  ********
16.08.55.354920    8%:  ********
16.08.56.411968    6%:  ******
16.08.57.468360    7%:  *******
16.08.58.469200    9%:  *********
16.08.59.494352   12%:  ************
16.09.00.546760    8%:  ********
16.09.01.547280    7%:  *******
16.09.02.550840    9%:  *********
16.09.03.563432    6%:  ******
16.09.04.577328    7%:  *******
16.09.05.605888    6%:  ******
16.09.06.618880    7%:  *******
16.09.07.634000   10%:  **********
16.09.08.635096    9%:  *********
16.09.09.657920    5%:  *****
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16.09.10.663976    8%:  ********
16.09.11.686872    8%:  ********
16.09.12.698400    6%:  ******
16.09.13.700648   10%:  **********
                                                    MO5


16.09.14.712656    7%:  *******
16.09.15.712784    7%:  *******
16.09.16.714176    8%:  ********
16.09.17.761360    7%:  *******
16.09.18.763880    7%:  *******
16.09.19.812632    5%:  *****
16.09.24.669432    1%:  *
16.09.25.681768   14%:  **************
16.09.26.685328   29%:  ******************************
16.09.27.702480    9%:  *********
16.09.28.843344    5%:  *****
16.09.29.855456    5%:  *****
16.09.30.859376    8%:  ********
16.09.31.865480    7%:  *******
16.09.32.945616    6%:  ******
16.09.33.947488    4%:  ****
16.09.34.976824    6%:  ******
16.09.36.048848    6%:  ******
16.09.37.083480    5%:  *****
16.09.38.133984    8%:  ********
16.09.39.135472    9%:  *********
16.09.40.158328    5%:  *****
16.09.41.164864    5%:  *****
16.09.42.199032    5%:  *****
16.09.43.199488    6%:  ******
16.09.44.208696    7%:  *******
16.09.45.227216    3%:  ***
16.09.46.227240    7%:  *******
16.09.47.234784    7%:  *******
16.09.48.286576    6%:  ******
16.09.49.298952    7%:  *******
16.09.50.318840    5%:  *****
16.09.51.328648    5%:  *****
16.09.52.330568    6%:  ******
16.09.56.720416    0%:
16.09.57.724680    6%:  ******
16.09.58.746672    6%:  ******
16.09.59.746688    6%:  ******
16.10.00.808216    6%:  ******
16.10.01.822000    5%:  *****
16.10.02.837480    5%:  *****
16.10.03.837488    5%:  *****
16.10.04.864528    5%:  *****
16.10.05.878216    4%:  ****
16.10.06.904832    4%:  ****
16.10.07.920080    3%:  ***
16.10.08.930560    4%:  ****
16.10.09.970144    5%:  *****
16.10.10.978648    6%:  ******
16.10.12.020944    4%:  ****
16.10.13.094208    3%:  ***
16.10.14.103768    4%:  ****
16.10.15.109464    6%:  ******
16.10.16.188304    4%:  ****
16.10.17.189608    5%:  *****
                                                    MO5


16.10.18.189624    4%:  ****
16.10.19.192376    5%:  *****
16.10.20.200512    4%:  ****
16.10.21.200976    4%:  ****
16.10.22.201176    5%:  *****
16.10.23.207072    6%:  ******
16.10.24.216672    6%:  ******
16.10.25.221360    6%:  ******
16.10.26.237936    4%:  ****
16.10.27.240112    5%:  *****
16.10.28.247296    5%:  *****
16.10.29.260208    5%:  *****
16.10.30.360528    6%:  ******
16.10.31.360696    4%:  ****
16.10.32.371104    6%:  ******
16.10.33.375248    6%:  ******
16.10.34.385456    5%:  *****
16.10.35.392640    6%:  ******
16.10.36.399064    3%:  ***
16.10.37.439608    6%:  ******
16.10.38.450664    5%:  *****
16.10.39.527120    6%:  ******
16.10.40.541536    5%:  *****
16.10.41.557232    5%:  *****
16.10.42.578448    5%:  *****
16.10.43.585384    7%:  *******
16.10.44.593240    6%:  ******
16.10.45.615224    6%:  ******
16.10.50.384120    0%:
16.10.51.411184    4%:  ****
16.10.52.442336    4%:  ****
16.10.53.455440    5%:  *****
16.10.54.503664    4%:  ****
```

```
16.10.55.505232    5%:  *****
16.10.56.505824    5%:  *****
16.10.57.512376    4%:  ****
16.10.58.513608    5%:  *****
16.10.59.517656    4%:  ****
16.11.00.543712    6%:  ******
16.11.01.552944   20%:  ********************
16.11.02.554760   25%:  *************************
16.11.03.555824   28%:  ****************************
16.11.04.556504   25%:  *************************
16.11.05.571600   15%:  ***************
16.11.06.711936    3%:  ***
16.11.11.035160    0%:
16.11.12.036576    4%:  ****
16.11.13.048592    6%:  ******
16.11.14.058304    5%:  *****
16.11.15.089920    5%:  *****
16.11.16.115096    7%:  *******
16.11.17.122752    5%:  *****
16.11.18.201856    3%:  ***
16.11.19.288816    4%:  ****
16.11.20.326200    7%:  *******
                                          MO5

16.11.21.503952    5%:  *****
16.11.22.505080    5%:  *****
16.11.23.523704    6%:  ******
16.11.24.575728    5%:  *****
16.11.25.596664    7%:  *******
16.11.26.599504    4%:  ****
16.11.27.599520    4%:  ****
16.11.28.605392    6%:  ******
16.11.29.605576    7%:  *******
16.11.30.623616    5%:  *****
16.11.31.657912    6%:  ******
16.11.32.715632    5%:  *****
16.11.33.774368    5%:  *****
16.11.34.774408    5%:  *****
16.11.35.776424    6%:  ******
16.11.36.848664    3%:  ***
16.11.37.867392    3%:  ***
16.11.38.867952    8%:  ********
16.11.39.912048    5%:  *****
16.11.41.043016    5%:  *****
16.11.42.106312    4%:  ****
16.11.43.124568    6%:  ******
16.11.44.167960    5%:  *****
16.11.45.176488    4%:  ****
16.11.46.359768    3%:  ***
16.11.47.362856    4%:  ****
16.11.48.383208    5%:  *****
16.11.49.400808    4%:  ****
16.11.50.402624    3%:  ***
16.11.51.403184    6%:  ******
16.11.52.459440    3%:  ***
16.11.53.492920    4%:  ****
16.11.54.494288    5%:  *****
16.11.55.530520    3%:  ***
16.11.56.532872    6%:  ******
16.11.57.542048    4%:  ****
16.11.58.545896    7%:  *******
16.11.59.547568    5%:  *****
16.12.00.553536    5%:  *****
16.12.01.558152    3%:  ***
16.12.02.558248    5%:  *****
16.12.03.578976    7%:  *******
16.12.08.274352    0%:
16.12.09.309392    4%:  ****
16.12.10.443216    5%:  *****
16.12.11.634512    4%:  ****
16.12.12.635456    6%:  ******
16.12.13.646336    5%:  *****
16.12.14.646400    7%:  *******
16.12.15.649920    5%:  *****
16.12.16.690896    5%:  *****
16.12.17.700392    7%:  *******
16.12.18.710648    5%:  *****
16.12.19.720216    6%:  ******
16.12.20.722384    5%:  *****
                                          MO5

16.12.21.722672    4%:  ****
16.12.22.734616    5%:  *****
16.12.23.739112    5%:  *****
16.12.24.770632    4%:  ****
16.12.25.771608    6%:  ******
16.12.26.788080    4%:  ****
16.12.27.823136    3%:  ***
16.12.28.827272    4%:  ****
-------------------------------------------------------------------------------------------------------------------------
Task ID: 0000881E Name:   PEXTRACE   A960126A   053555     CPU % of Session: 0.388%     CPU % of Job existence: 0.388%
Timestamp        CPU%   Histogram
-------------------------------------------------------------------------------------------------------------------------
16.07.24.509608    3%:  ***
16.07.25.517552   18%:  ******************
16.07.26.594800   19%:  *******************
```

```
16.07.27.607640   35%:  **********************************
16.12.27.721584    0%:
16.12.28.732536   19%:  ******************
```

10.9 Program Activations and Deactivations (PRTPEXCPUB Command)

This section provides an example of every report you can produce using this command.

Please refer to Section 6.6.9, “DEACTS Reporting Command” on page 163 for a details of how to use the DEACTS command to produce these reports.

Refer to Table 13 on page 168 for details of the type of data you must collect using the Enhanced PEX TRACE SMTBCH command in order to be able to produce these reports.

10.9.1 Report Title - Program Activates and Deactivates in Program within Job Sequence

```
                                        Program Activates and Deactivates
                                        in
                                        Program within Job Sequence
                                   QUERY NAME . . . . . DEACTJPO4
                                   LIBRARY NAME . . . . SMTRACE
                                   FILE         LIBRARY      MEMBER       FORMAT
                                   DEACTJPO3    DHPEX        DEACTO2      DEACTJPO3
                                   DEACTJPO2    DHPEX        DEACTO2      DEACTJPO2
                                   DATE . . . . . 08/12/96
                                   TIME . . . . . 12:45:17
                                     Program Deactivates - part 5 - job/pgm report

08/12/96  12:45:17         Program Activate/Deactivate in Job/Pgm Sequence          PAGE    1
Job                        Program         Program     Program    Pct Pgm Activates Total
                                             Activate    Deactivate of Job Activates  Activates
                                             Count       Count                        for Job
QPADEV000A960123A  053195 ILEP3                   7             7        46.67             15
                          OPMPO1                  5             5        33.33             15
                          ILEP2                   1             0         6.67             15
                          QCADRV2                 1             0         6.67             15
                          QRGXINIT                1             0         6.67             15
                               TOTAL             15            12
P23XWY32G A960123A  053201 ILEP3                  6             6        46.15             13
                          OPMPO1                  3             3        23.08             13
                          ILEP2                   1             0         7.69             13
                          OPMPO2                  1             0         7.69             13
                          QRGXINIT                1             0         7.69             13
                          QYPEENDP                1             0         7.69             13
                               TOTAL             13             9
P23XWY32E A960123A  053197 ILEP1                  1             0        33.33              3
                          OPMPO2                  1             0        33.33              3
                          QRGXINIT                1             0        33.33              3
                               TOTAL              3             0
                               FINAL TOTALS
                               TOTAL             31            21
```

10.9.2 Report Title - Total Program Deactivates by Job

```
                                   Total Program Deactivations
                                   by Job
                                   NOTE:  Jobs with 0 Deactivations are not included in this report
                                          QUERY NAME . . . . . DEACTJPO6
                                          LIBRARY NAME . . . . SMTRACE
                                          FILE         LIBRARY      MEMBER       FORMAT
                                          DEACTJPO5    DHPEX        DEACTO2      DEACTJPO5
                                          DEACTJPDO1   DHPEX        DEACTO2      DEACTJPDO1
                                          DATE . . . . . 08/12/96
                                          TIME . . . . . 12:45:18
                                              Deact - part 7 - total deact by job report

08/12/96  12:45:18  Total Program Deactivations by Job  PAGE    1
Job                                Job              Job  Pct
                                   Deact            Act  System
                                                         Deact
QPADEV000A960123A  053195             12             15   57.14
P23XWY32G A960123A  053201             9             13   42.86
                     FINAL TOTALS
                     TOTAL            21             28
```

10.9.3 Report Title - Program Activations and Deactivations in Pgm/Job Descending Activation Sequence

```
                                    Program Activates and Deactivates
                                    in
                                    Job within Program Descending Activate Sequence
                                   QUERY NAME . . . . . DEACTPJO4A
                                   LIBRARY NAME . . . . SMTRACE
                                   FILE         LIBRARY      MEMBER       FORMAT
                                   DEACTPJO4    DHPEX        DEACTO2      DEACTPJO4
                                   TASKINFO     DHPEX        DEACTO2      TASKINFO
                                   DATE . . . . . . . . 08/12/96
                                   TIME . . . . . . . . 12:45:25
                                     Program DEACTS - pgm/job in desc act sequence

08/12/96  12:45:25       Program Activate/Deactivate in Pgm/Job Sequence        PAGE    1
Program     Job                           Activates    Deactivates  Pct Pgm/Job
                                          for          for          Activates
                                          Pgm/Job      Pgm/Job      of All Pgm Activates
ILEP3       QPADEVOOO6A960123A  053195             7             7          53.85
            P23XWY32G A960123A  053201             6             6          46.15
                                TOTAL             13            13
OPMPO1      QPADEVOOO6A960123A  053195             5             5          62.50
            P23XWY32G A960123A  053201             3             3          37.50
                                TOTAL              8             8
QRGXINIT    QPADEVOOO6A960123A  053195             1             0          33.33
            P23XWY32E A960123A  053197             1             0          33.33
            P23XWY32G A960123A  053201             1             0          33.33
                                TOTAL              3             0
ILEP2       QPADEVOOO6A960123A  053195             1             0          50.00
            P23XWY32G A960123A  053201             1             0          50.00
                                TOTAL              2             0
OPMPO2      P23XWY32E A960123A  053197             1             0          50.00
            P23XWY32G A960123A  053201             1             0          50.00
                                TOTAL              2             0
ILEP1       P23XWY32E A960123A  053197             1             0         100.00
                                TOTAL              1             0
QCADRV2     QPADEVOOO6A960123A  053195             1             0         100.00
                                TOTAL              1             0
QYPEENDP    P23XWY32G A960123A  053201             1             0         100.00
                                                   M05


08/12/96  12:45:25       Program Activate/Deactivate in Pgm/Job Sequence        PAGE    2
Program     Job                           Activates    Deactivates  Pct Pgm/Job
                                          for          for          Activates
                                          Pgm/Job      Pgm/Job      of All Pgm Activates
                                TOTAL              1             0
                                FINAL TOTALS
                                TOTAL             31            21
```

10.9.4 Report Title - Total Activations and Deactivations by Program

This report includes both application and system programs.

```
                                       Total Program Activations/Deactivations
                                       by Program
                                   QUERY NAME . . . . . DEACTPJO6
                                   LIBRARY NAME . . . . SMTRACE
                                   FILE         LIBRARY      MEMBER       FORMAT
                                   DEACTPJO5    DHPEX        DEACTO2      DEACTPJO5
                                   DEACTPJAO1   DHPEX        DEACTO2      DEACTPJAO1
                                   DATE . . . . . . . . 08/12/96
                                   TIME . . . . . . . . 12:45:26
                                        Deact - part 7 - total act/deact by pgm

08/12/96  12:45:26  Total Program Activations/Deactivations by Program  PAGE    1
Program          Program      Program     Pct
                 Activate     Deactivate  System
                 Count        Count       Activations
ILEP3                  13             13      41.94
OPMPO1                  8              8      25.81
QRGXINIT                3              0       9.68
ILEP2                   2              0       6.45
OPMPO2                  2              0       6.45
ILEP1                   1              0       3.23
QCADRV2                 1              0       3.23
QYPEENDP                1              0       3.23
      FINAL TOTALS
      TOTAL            31             21
```

10.9.5 Report Title - Total Activations and Deactivations by Non-system Program

This report includes application programs only. All program names beginning with the letter ′Q′ will not appear on this report.

```
                                    Total Non-System Program Activations/Deactivations
                                    by Program
                                    QUERY NAME . . . . . DEACTPJO6A
                                    LIBRARY NAME . . . . SMTRACE
                                    FILE         LIBRARY      MEMBER       FORMAT
                                    DEACTPJO5    DHPEX        DEACTO2      DEACTPJO5
                                    DEACTPJAO1   DHPEX        DEACTO2      DEACTPJAO1
                                    DATE . . . . . 08/12/96
                                    TIME . . . . . 12:45:27
                                    Deact - part 8 - total appln pgm act/deact by pgm

08/12/96  12:45:27  Total Non-System Program Activations/Deactivations by Program      PAGE    1
                    (application program names starting with 'Q' will not be counted)
Non-system  Non-system        Non-system          Pct
Program     Program Activate  Program Deactivate  Systemwide
            Count             Count               Activations
ILEP3                   13                13        41.94
OPMPO1                   8                 8        25.81
ILEP2                    2                 0         6.45
OPMPO2                   2                 0         6.45
ILEP1                    1                 0         3.23
        FINAL TOTALS
        TOTAL           26                21
```

Appendix A. AS/400 MI Complex Instructions (Partial List)

This list of MI Complex Instructions is provided to assist you in determining the function being performed by the system to accomplish some application or OS/400 function.

*ACTBPGM	ACTIVATE BOUND PROGRAM	*DBGINT	DEBUG INTERPRETER
*ACTCR	ACTIVATE CURSOR	*DBLEVTMN	DISABLE EVENT MONITOR
*ACTPG	ACTIVATE PROGRAM	*DBMAINT	DATA BASE MAINTENANCE
*APYJCHG	APPLY JOURNAL CHANGES	*DBMATCH	DATA BASE PATTERN MATCH
*CANEVTMN	CANCEL EVENT MONITOR	*DCPDATA	DECOMPRESS DATA
*CANINV	CANCEL INVOCATION	*DEACTBM	DEACTIVATE PROGRAMS BY MARK
*CANINVTR	CANCEL INVOCATION TRACE	*DEACTCR	DE-ACTIVATE CURSOR
*CANTRINS	CANCEL TRACE INSTRUCTIONS	*DEACTPG	DE-ACTIVATE PROGRAM
*CDD	COMPUTE DATE DURATION	*DECD	DECREMENT DATE
*CHKDCT	CHECK DICTIONARY	*DECOMMIT	DECOMMIT
*CIPHER	CIPHER	*DECT	DECREMENT TIME
*CIPHERKY	CIPHER KEY	*DECTS	DECREMENT TIMESTAMP
*COMMIT	COMMIT	*DELDSEN	DELETE DATA SPACE ENTRY
*CPRDATA	COMPRESS DATA	*DELPGOBS	DELETE PROGRAM OBSERVABILITY
*CPYDSE	COPY DATA SPACE ENTRIES	*DEQ	DEQUEUE
*CRTAG	CREATE ACCESS GROUP	*DEQWAIT	DEQUEUE WAIT
*CRTAL	CREATE AUTHORIZATION LIST	*DESAG	DESTROY ACCESS GROUP
*CRTAUXSV	CREATE AUXILIARY SERVER	*DESAGP	DESTROY ACTIVATION GROUP
*CRTBPGM	CREATE BOUND PROGRAM	*DESAL	DESTROY AUTHORIZATION LIST
*CRTCB	CREATE COMMIT BLOCK	*DESAUXSV	DESTROY AUXILIARY SERVER
*CRTCD	CREATE CONTROLLER DESCRIPTION	*DESBSS	DESTROY BYTE STRING SPACE
*CRTCFGD	CREATE CONFIG. DESCRIPTION	*DESCB	DESTROY COMMIT BLOCK
*CRTCNNL	CREATE CONNECTION LIST	*DESCD	DESTROY CONTROLLER DESCRIPTION
*CRTCR	CREATE CURSOR	*DESCNNL	DESTROY CONNECTION LIST
*CRTCSD	CREATE CLASS OF SERVICE DESC.	*DESCR	DESTROY CURSOR
*CRTCTX	CREATE CONTEXT	*DESCSD	DESTROY CLASS OF SERVICE DESC.
*CRTDCT	CREATE DICTIONARY	*DESCTX	DESTROY CONTEXT
*CRTDMPS	CREATE DUMP SPACE	*DESDCT	DESTROY DICTIONARY
*CRTDOBJ	CREATE DUPLICATE OBJECT	*DESDMPS	DESTROY DUMP SPACE
*CRTDS	CREATE DATA SPACE	*DESDS	DESTROY DATA SPACE
*CRTDSIM	CREATE DATA SPACE ENTRY IMAGE	*DESDSINX	DESTROY DATA SPACE INDEX
*CRTDSINX	CREATE DATA SPACE INDEX	*DESHRI	DESTROY HARDWARE RESOURCE INFO
*CRTHS	CREATE HEAP SPACE	*DESHS	DESTROY HEAP SPACE
*CRTINX	CREATE INDEPENDENT INDEX	*DESINX	DESTROY INDEPENDENT INDEX
*CRTITER	CREATE ITERATOR	*DESITER	DESTROY ITERATOR
*CRTJP	CREATE JOURNAL PORT	*DESJP	DESTROY JOURNAL PORT
*CRTJS	CREATE JOURNAL SPACE	*DESJS	DESTROY JOURNAL SPACE
*CRTLUD	CREATE LOGICAL UNIT DESC.	*DESLUD	DESTROY LOGICAL UNIT DESC.
*CRTMD	CREATE MODE DESCRIPTION	*DESMD	DESTROY MODE DESCRIPTION
*CRTMOD	CREATE MODULE	*DESMOD	DESTROY MODULE
*CRTMTX	CREATE MUTEX	*DESMTX	DESTROY MUTEX
*CRTND	CREATE NETWORK DESCRIPTION	*DESND	DESTROY NETWORK DESCRIPTION
*CRTNWID	CREATE NETWORK INTERFACE DESC	*DESNWID	DESTROY NETWORK INTERFACE DESC
*CRTPCS	CREATE PROCESS CONTROL SPACE	*DESPCS	DESTROY PROCESS CONTROL SPACE
*CRTPG	CREATE PROGRAM	*DESPG	DESTROY PROGRAM
*CRTQ	CREATE QUEUE	*DESQ	DESTROY QUEUE
*CRTQS	CREATE QUEUE SPACE	*DESQS	DESTROY QUEUE SPACE
*CRTS	CREATE SPACE	*DESS	DESTROY SPACE
*CRTUP	CREATE USER PROFILE	*DESSOM	DESTROY SOM OBJECT
*CTD	COMPUTE TIME DURATION	*DESUP	DESTROY USER PROFILE
*CTSD	COMPUTE TIMESTAMP DURATION	*DIAG	DIAGNOSE
*CVTCM	CONVERT CHARACTER TO MRJE	*EBLEVTMN	ENABLE EVENT MONITOR
*CVTCN,LB	CONVERT CHAR/NUM, LB CPY NUM V	*ENQ	ENQUEUE
*CVTCS	CONVERT CHARACTER TO SNA	*ENSDSEN	ENSURE DATA SPACE ENTRIES
*CVTD	CONVERT DATE	*ENSOBJ	ENSURE OBJECT
*CVTEFN	CONVERT EXTERNAL FORM TO NUM	*ESTDSIKR	ESTIMATE SIZE OF DSI KEY RANGE
*CVTMC	CONVERT MRJE TO CHARACTER	*EXTRMOD	EXTRACT MODULE
*CVTSC	CONVERT SNA TO CHARACTER	*FNDINXEN	FIND INDEPENDENT INDEX ENTRY
*CVTT	CONVERT TIME	*FNDRINVN	FIND RELATIVE INVOCATION NUM.
*CVTTS	CONVERT TIMESTAMP	*FREHSSMK	FREE HEAP SPACE STG FROM MARK

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*FSERVOP	FILE SERVER OPERATION
*FSREAD	FILE SYSTEM READ
*FSROUTE	FILE SERVER/SYSTEM ROUTER
*FSWRITE	FILE SYSTEM WRITE
*GENUUID	GENERATE UNIVERSAL UNIQUE ID
*GRANT	GRANT AUTHORITY
*GRNTLIKE	GRANT-LIKE AUTHORITY
*GRNTLIKO	GRANT-LIKE OBJECT AUTHORITY
*INCD	INCREMENT DATE
*INCT	INCREMENT TIME
*INCTS	INCREMENT TIMESTAMP
*INITPR	INITIATE PROCESS
*INSDMPD	INSERT DUMP DATA
*INSDSEN	INSERT DATA SPACE ENTRY
*INSINXEN	INSERT INDEPENDENT INDEX ENTRY
*INSSDSE	INSERT SEQ. DATA SPACE ENTRIES
*INVP	INVOCATION POINTER
*JRNLD	JOURNAL DATA
*JRNLOBJ	JOURNAL OBJECT
*LINKDIR	LINK DIRECTORY
*LOCK	LOCK OBJECT
*LOCKSL	LOCK SPACE LOCATION
*LOGICAL	LOGICAL AND, OR, EXCLUSIVE OR
*LOOKUP	LOOKUP DIRECTORY
*MATACTAT	MATERIALIZE ACTIVATION ATTRS.
*MATACTEX	MATERIALIZE ACTIVATION EXPORT
*MATAGAT	MATERIALIZE ACCESS GROUP ATTRS
*MATAGPAT	MATER. ACTIVATION GROUP ATTRS.
*MATAL	MATERIALIZE AUTHORIZATION LIST
*MATAOL	MATER. ALLOCATED OBJECT LOCKS
*MATAU	MATERIALIZE AUTHORITY
*MATAUOBJ	MATERIALIZE AUTHORIZED OBJECTS
*MATAUU	MATERIALIZE AUTHORIZED USERS
*MATAUXSV	MATERIALIZE AUXILIARY SERVER
*MATBPGM	MATERIALIZE BOUND PROGRAM
*MATBSS	MATERIALIZE BYTE STRING SPACE
*MATCBATR	MATERIALIZE COMMIT BLOCK ATTRS
*MATCD	MATERIALIZE CONTROLLER DESC.
*MATCFGD	MATER. CONFIG. DEFINITION
*MATCFGDC	MATER. CONFIG. DEF. CHOICES
*MATCNNL	MATERIALIZE CONNECTION LIST
*MATCRAT	MATERIALIZE CURSOR ATTRIBUTES
*MATCSD	MATER. CLASS OF SERVICE DESC.
*MATCTX	MATERIALIZE CONTEXT
*MATDCT	MATERIALIZE DICTIONARY ATTRS.
*MATDMPS	MATERIALIZE DUMP SPACE
*MATDRECL	MATER. DATA SPACE RECORD LOCKS
*MATDSAT	MATERIALIZE DATA SPACE ATTRS.
*MATDSIAT	MATER. DATA SPACE INDEX ATTRS.
*MATEVTMN	MATERIALIZE EVENT MONITORS
*MATEXCPD	MATERIALIZE EXCEPTION DESC.
*MATHRI	MATER. HARDWARE RESOURCE INFO.
*MATHRICD	MATER. HRI CLASS DETAILS
*MATHRIR	MATER. RESOURCE INFO. RELATIVE
*MATHSAT	MATERIALIZE HEAP SPACE ATTRS.
*MATINAT	MATERIALIZE INSTRUCTION ATTRS.
*MATINV	MATERIALIZE INVOCATION ATTRS.
*MATINVAT	MATERIALIZE INVOCATION ATTRS.
*MATINVIF	MATERIALIZE INVOCATION INFO.
*MATINVS	MATERIALIZE INVOCATION STACK
*MATINXAT	MATER. INDEPENDENT INDEX ATTRS
*MATJOAT	MATER. JOURNALED OBJECT ATTRS.
*MATJOBJ	MATERIALIZE JOURNALED OBJECTS
*MATJPAT	MATERIALIZE JOURNAL PORT ATTRS
*MATJSAT	MATERIALIZE JOURNAL SPACE ATTR
*MATLUD	MATERIALIZE LOGICAL UNIT DESC.
*MATMATR1	MATERIALIZE MACHINE ATTRS. 1
*MATMATR2	MATERIALIZE MACHINE ATTRS. 2
*MATMD	MATERIALIZE MODE DESCRIPTION
*MATMOD	MATERIALIZE MODULE
*MATMTX	MATERIALIZE MUTEX
*MATND	MATERIALIZE NETWORK DESC.
*MATNWID	MATERIALIZE NETWORK INT DESC
*MATOBJLK	MATERIALIZE OBJECT LOCKS
*MATOLNK	MATERIALIZE OBJECT LINKS
*MATPG	MATERIALIZE PROGRAM
*MATPID	MATPID
*MATPNSIG	MATPNSIG
*MATPRAGP	MATER. PROCESS ACTIV. GROUPS
*MATPRATR	MATERIALIZE PROCESS ATTRIBUTES
*MATPRECL	MATER. PROCESS RECORD LOCKS
*MATPRLK	MATERIALIZE PROCESS LOCKS
*MATPRMSG	MATERIALIZE PROCESS MESSAGE
*MATPRMTX	MATER. PROCESS MUTEX LOCKS
*MATPTR	MATERIALIZE POINTER
*MATPTRIF	MATERIALIZE POINTER INFO.
*MATPTRL	MATERIALIZE POINTER LOCATIONS
*MATPUID	MATER. PROCESS USER/GROUP IDS
*MATQAT	MATERIALIZE QUEUE ATTRIBUTES
*MATQMSG	MATERIALIZE QUEUE MESSAGES
*MATQSAT	MATERIALIZE QUEUE SPACE ATTRS.
*MATRMD	MATERIALIZE RESOURCE MGMT DATA
*MATS	MATERIALIZE SPACE ATTRIBUTES
*MATSELLK	MATERIALIZE SELECTED LOCKS
*MATSIGMN	MATSIGMN
*MATSOBJ	MATERIALIZE SYSTEM OBJECT
*MATSSATR	MATER. STATIC SECTION ATTRS.
*MATSSP	MATER. SECONDARY SPACE POINTER
*MATUP	MATERIALIZE USER PROFILE
*MATUPID	MATER. USER PROF. FROM UID GID
*MNEVT	MONITOR EVENT
*MODADR	MODIFY ADDRESSABILITY
*MODAL	MODIFY AUTHORIZATION LIST
*MODAUXSV	MODIFY AUXILIARY SERVER
*MODBPGM	MODIFY BOUND PROGRAM
*MODCB	MODIFY COMMIT BLOCK
*MODCD	MODIFY CONTROLLER DESCRIPTION
*MODCFGD	MODIFY CONFIG. DESCRIPTION
*MODCNNL	MODIFY CONNECTION LIST
*MODCSD	MODIFY CLASS OF SERVICE DESC.
*MODCTX	MODIFY CONTEXT
*MODDIRE	MODIFY DIRECTORY ENTRY
*MODDMPS	MODIFY DUMP SPACE
*MODDSAT	MODIFY DATA SPACE ATTRIBUTES
*MODDSIA	MODIFY DATA SPACE INDEX ATTRS.
*MODEXCPD	MODIFY EXCEPTION DESCRIPTION
*MODHRI	MODIFY HARDWARE RESOURCE INFO.
*MODINVAT	MODIFY INVOCATION ATTRIBUTES
*MODINX	MODIFY INDEPENDENT INDEX
*MODJP	MODIFY JOURNAL PORT
*MODLUD	MODIFY LOGICAL UNIT DESC.
*MODMATR	MODIFY MACHINE ATTRIBUTES
*MODMD	MODIFY MODE DESCRIPTION
*MODMOD	MODIFY MODULE
*MODND	MODIFY NETWORK DESCRIPTION
*MODNWID	MODIFY NETWORK INTERFACE DESC
*MODPEVTM	MODIFY PROCESS EVENT MASK
*MODPG	MODIFY PROGRAM
*MODPID	MODPID
*MODPRATR	MODIFY PROCESS ATTRIBUTES
*MODPRMSG	MODIFY PROCESS MESSAGE
*MODPSIGM	MODPSIGM

*MODQSAT	MODIFY QUEUE SPACE ATTRIBUTES
*MODRMC	MODIFY RESOURCE MGMT CONTROLS
*MODSIGBM	MODSIGBM
*MODSIGMN	MODSIGMN
*MODSOBJ	MODIFY SYSTEM OBJECT
*MODS1	MODIFY SPACE ATTRIBUTES 1
*MODS2	MODIFY SPACE ATTRIBUTES 2
*MODTRC	MODIFY TRACE
*MODUP	MODIFY USER PROFILE
*NFYHDWCH	NOTIFY WHEN HARDWARE CHANGES
*RECLAIM	RECLAIM LOST OBJECTS
*RENAME	RENAME OBJECT
*REQIO	REQUEST I/O
*REQPO	REQUEST PATH OPERATION
*REQSO	REQUEST STATISTICS OPERATION
*RESAG	RESET ACCESS GROUP
*RESERVED	- RESERVED -- DO NOT USE -
*RESPR	RESUME PROCESS
*RETDMPD	RETRIEVE DUMP DATA
*RETDSEN	RETRIEVE DATA SPACE ENTRY
*RETEVTD	RETRIEVE EVENT DATA
*RETEXCPD	RETRIEVE EXCEPTION DATA
*RETJENT	RETRIEVE JOURNAL ENTRIES
*RETRACT	RETRACT AUTHORITY
*RETSDSE	RETRIEVE SEQ. DATA SPACE ENT.
*RETSIMEN	RETRIEVE SIMPLE DS ENTRIES
*RINZSTAT	REINITIALIZE STATIC STORAGE
*RLSDSEN	RELEASE DATA SPACE ENTRIES
*RMVINXEN	REMOVE INDEPENDENT INDEX ENTRY
*RNMDIRO	RENAME DIRECTORY OBJECT
*RSLVDP	RESOLVE DATA POINTER
*RSLVSP	RESOLVE SYSTEM POINTER
*RTNEXCP	RETURN FROM EXCEPTION
*SELFNC	SELECT FUNCTIONS
*SETACST	SET ACCESS STATE
*SETBPFP	SET BEHAVIOR PTR. FROM PTR.
*SETCR	SET CURSOR
*SETHSSMK	SET HEAP SPACE STORAGE MARK
*SETMPFP	SET METHOD PTR. FROM PTR.
*SETOBPFI	SET OBJ. PTR. FROM SOM OBJ ID
*SETOBPFP	SET OBJECT PTR. FROM PTR.
*SETOINGR	SET OLDEST INV. IN ACT. GROUP
*SIGEVT	SIGNAL EVENT
*SIGEXBRF	SIGNAL EXCEPTION BRIEF
*SIGEXCP	SIGNAL EXCEPTION
*SIGTIMER	SIGTIMER
*SNDPRMSG	SEND PROCESS MESSAGE
*SNDSIG	SNDSIG
*SNSEXCPD	SENSE EXCEPTION DESCRIPTION
*SRCHDCT	SEARCH DICTIONARY
*SRCHHRI	SEARCH HARDWARE RESOURCE INFO.
*SUSOBJ	SUSPEND OBJECT
*SUSPR	SUSPEND PROCESS
*TERMINST	TERMINATE INSTRUCTION
*TERMMPR	TERMINATE MACHINE PROCESSING
*TERMPR	TERMINATE PROCESS
*TESTAU	TEST AUTHORITY
*TESTAURC	TEST AUTH. RETURN COLLECTIVE
*TESTEAU	TEST EXTENDED AUTHORITIES
*TESTEVT	TEST EVENT
*TESTEXCP	TEST EXCEPTION
*TESTSOBJ	TEST SYSTEM OBJECT
*TESTULA	TEST USER LIST AUTHORITY
*TRINS	TRACE INSTRUCTIONS
*TRINV	TRACE INVOCATIONS
*UNLINK	UNLINK DIRECTORY
*UNLOCK	UNLOCK OBJECT
*UNLOCKSL	UNLOCK SPACE LOCATION
*UPDSEN	UPDATE DATA SPACE ENTRY
*VALCFGD	VALIDATE CONFIG. DEFINITION
*VFYCFGD	VERIFY CONFIG. DESCRIPTION
*WAITEVT	WAIT ON EVENT
*WAITSIG	WAITSIG
*WAITTIME	WAIT ON TIME
*XFRGO	TRANSFER GROUP OWNERSHIP
*XFRLOCK	TRANSFER OBJECT LOCK
*XFRO	TRANSFER OWNERSHIP

Appendix B. AS/400 Modules (Partial List)

This list is provided to assist you in interpreting what OS/400 or IBM licensed program module is being used to accomplish an application or other OS/400 program requested function.

$ARSP	AUTO RESPONSE
$BICR	S36EE--$BICR FILE TRANSFER UTILITY
$BMENU	CREATE A MENU FROM A MESSAGE FILE
$COPY	$COPY MAINLINE MODULE
$CPPE	PROC INTERFACE TO MESSAGE HANDLING
$DDST	$DDST-KEYSORT UTILITY
$DELET	$DELET - S/36 DELETE UTILITY
$DPGP	UTILITY FOR PRTGRAPH
$DPGR	UTILITY FOR BLDGRAPH
$DPGR2	UTILITY FOR BLDGRAPH
$DUPRD	$DUPRD - S/36 DISKETTE COPY UTILITY
$FBLD	$FBLD
$FREE	CONDENSE PROCEDURE MODULE
$HELP	MCH/36 ENVIRONMENT PROCESSOR
$INIT	PLATFORM INITIALIZE DISKETTE
$LABEL	VTOC/TAPE LABEL DISPLAY
$MAINT	$MAINT
$MGBLD	CREATE A MESSAGE FILE FROM S/36 MSG SRC
$PRPWD	S/36 E CHANGE PASSWORD UTILITY
$RENAM	$RENAM - S/36 RENAME UTILITY
$SETCF	S/36 E $SETCF UTILITY PROGRAM
$SFGR	CREATE A DISPLAY FILE FROM S/36 SFGR SRC
$SVCASRV	CACHE UTILITY PROCEDURE
$SYSLIST	HANDLE S/36 SYSLIST PRINTER PROCESSING
$SYSOVR	SET OVERRIDE INFO FROM SYSLIST ATTRIBUTE
$TCOPY	TAPECOPY BASE MODULE
$TINIT	S/36EE TAPE INITIALIZATION UTILITY
$UASC	USER ACCESS TO SPOOL - DISPLAY/PRINT
$UASF	USER ACCESS TO SPOOL - COPY MODULE
#DSIN	IDDU PROCEDURE HANDLER
#EMAD	S/36 BSC DISPLAY EMUALTION
#EMFP	S/36 BSC EMULATION PRE-PROCESSOR
#EM9D	S/36 BSC PRINTER EMUALTION
#ESAD	S/36 SNA DISPLAY EMUALTION
#ESEP	S/36 MODULE EMULATING RUN OF EP3270
#ESFP	S/36 SNA EMULATION PRE-PROCESSOR
#ESPI	S/36 SNA PRINTER EMUALTION
#GSORT	GENERAL SORT USING S/38 REFORMAT
#KASRT	IGC SORT USING REFORMAT
#MEEP	S/36 MODULE EMULATING RUN OF MS3270
#MEFP	S/36 SNA EMULATION PRE-PROCESSOR MS3270
#ORPR	S36 PGM: ORGANIZER PROFILE OPTIONS
#ORTS	S36 PGM: ORGANIZER INDICATION SETTER
#ORXT	S36 PGM: TERMINATE AND EXECUTE
#QUDA	S/36 PGM: INITIAL QUERY MODULE
#TUPH	OFFICE PROCEDURE HANDLER
#TUPQ	OFFICE PRINT QUEUE PROC HANDLER
#TVRT	TEXTDOC PRTFILE HANDLER FOR S/36 EE
#USYX	UTILITY CONTROL STATEMENT SYNTAX CHECKER
AFRIKAAN	FROM PC LEXAM MERGE CODE
ASREAD	GDDM ENTRY MODULE
BNEXCH	C EXCEPTION HANDLING ROUTINES
CDRCVRT	API TO CONVERT GRAPHIC DATA
CDRGCCN	API TO GET CCSID FOR NORMALIZATION
CDRGESP	API TO GET ENCODING SCHEME
CDRGRDC	API TO GET RELATED DEFAULT CCSID
CDRSCSP	API TO GET SHORT FORM CCSID
CHAATT	GDDM ENTRY MODULE
CHAREA	GDDM ENTRY MODULE
CHBAR	GDDM ENTRY MODULE
CHBATT	GDDM ENTRY MODULE
CHCGRD	GDDM ENTRY MODULE
CHCOL	GDDM ENTRY MODULE
CHDATT	GDDM ENTRY MODULE
CHDRAX	GDDM ENTRY MODULE
CHFINE	GDDM ENTRY MODULE
CHGAP	GDDM ENTRY MODULE
CHGATT	GDDM ENTRY MODULE
CHGGAP	GDDM ENTRY MODULE
CHHATT	GDDM ENTRY MODULE
CHHEAD	GDDM ENTRY MODULE
CHHIST	GDDM ENTRY MODULE
CHHMAR	GDDM ENTRY MODULE
CHKATT	GDDM ENTRY MODULE
CHKEY	GDDM ENTRY MODULE
CHKEYP	GDDM ENTRY MODULE
CHKMAX	GDDM ENTRY MODULE
CHKOFF	GDDM ENTRY MODULE
CHKRCVR	FROM PC LEXAM MERGE CODE
CHLATT	GDDM ENTRY MODULE
CHLT	GDDM ENTRY MODULE
CHLW	GDDM ENTRY MODULE
CHMARK	GDDM ENTRY MODULE
CHNATT	GDDM ENTRY MODULE
CHNOFF	GDDM ENTRY MODULE
CHNOTE	GDDM ENTRY MODULE
CHNUM	GDDM ENTRY MODULE
CHPAT	GDDM ENTRY MODULE
CHPCTL	NEW API CALL
CHPEXP	NEW API CALL
CHPIE	GDDM ENTRY MODULE
CHPIER	GDDM ENTRY MODULE
CHPLOT	GDDM ENTRY MODULE
CHRNIT	GDDM ENTRY MODULE
CHSET	GDDM ENTRY MODULE
CHSTRT	GDDM ENTRY MODULE
CHSURF	GDDM ENTRY MODULE
CHTATT	GDDM ENTRY MODULE
CHTERM	GDDM ENTRY MODULE
CHVATT	GDDM ENTRY MODULE
CHVCHR	GDDM ENTRY MODULE
CHVENN	GDDM ENTRY MODULE
CHVMAR	GDDM ENTRY MODULE
CHXDAY	GDDM ENTRY MODULE
CHXDTM	GDDM ENTRY MODULE
CHXINT	GDDM ENTRY MODULE
CHXLAB	GDDM ENTRY MODULE
CHXLAT	NEW API CALL
CHXMTH	GDDM ENTRY MODULE
CHXRNG	GDDM ENTRY MODULE
CHXSCL	GDDM ENTRY MODULE
CHXSEL	GDDM ENTRY MODULE
CHXSET	GDDM ENTRY MODULE
CHXTIC	GDDM ENTRY MODULE
CHXTTL	GDDM ENTRY MODULE
CHYDAY	GDDM ENTRY MODULE
CHYDTM	GDDM ENTRY MODULE
CHYINT	GDDM ENTRY MODULE
CHYLAB	GDDM ENTRY MODULE
CHYLAT	NEW API CALL
CHYMTH	GDDM ENTRY MODULE
CHYRNG	GDDM ENTRY MODULE
CHYSCL	GDDM ENTRY MODULE
CHYSEL	GDDM ENTRY MODULE
CHYSET	GDDM ENTRY MODULE
CHYTIC	GDDM ENTRY MODULE
CHYTTL	GDDM ENTRY MODULE
CMACCP	CPI-C ACCEPT CONVERSATION
CMALLC	CPI-C ALLOCATE CONVERSATION
CMCFM	CPI-C CONFIRM MODULE
CMCFMD	CPI-C CONFIRMED
CMCNVI	CPI-C CONVERT INCOMING
CMCNVO	CPI-C CONVERT OUTGOING
CMCOBOL	CPI-C API HEADER FOR CBL
CMCOBOL	CPI-C HEADER IN ILE/COBOL
CMDEAL	CPI-C DEALLOCATE_CONVERSATION

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CMECS     CPI-C EXTRACT CONVERSATION STATE
CMECT     CPI-C EXTRACT CONVERSATION TYPE
CMEMBS    CPI-C EXTRACT MAXIMUM BUFFER SIZE
CMEMN     CPI-C EXTRACT_MODE_NAME
CMEPLN    CPI-C EXTRACT_PARTNER_LU_NAME
CMESL     CPI-C EXTRACT_SYNC_LEVEL
CMESUI    CPI-C EXTRACT_SECURITY_USER_ID
CMFLUS    CPI-C FLUSH MODULE
CMINIT    CPI-C INITIALIZE CONVERSATION
CMPTR     CPI-C PREPARE TO RECEIVE MODULE
CMRCV     CPI-C RECEIVE DATA MODULE
CMRPG     CPI-C API HEADER IN RPG
CMRPG     CPI-C HEADER IN ILE/RPG
CMRTS     CPI-C REQUEST TO SEND
CMSCSP    SET_CONVERSATION_SECURITY_PASSWORD
CMSCST    SET_CONVERSATION_SECURITY_TYPE
CMSCSU    SET_CONVERSATION_SECURITY_USER_ID
CMSCT     SET_CONVERSATION_TYPE
CMSDT     SET_DEALLOCATE_TYPE
CMSED     SET_ERROR_DIRECTION
CMSEND    CPI-C SEND DATA MODULE
CMSERR    CPI-C SEND ERROR MODULE
CMSF      SET_FILL
CMSLD     SET_LOG_DATA
CMSMN     SET_MODE_NAME
CMSPLN    SET_PARTNER_LU_NAME
CMSPTR    SET_PREPARE_TO_RECEIVE_TYPE
CMSRC     SET_RETURN_CONTROL
CMSRT     SET_RECEIVE_TYPE
CMSSL     SET_SYNC_LEVEL
CMSST     SET_SEND_TYPE
CMSTPN    SET_TP_NAME
CWCI      CMPD WORD COMPONENT ISOLATION
DEHYPHDE  FROM PC LEXAM MERGE CODE
DSCLS     GDDM ENTRY MODULE
DSDROP    GDDM ENTRY MODULE
DSOPEN    GDDM ENTRY MODULE
DSQCIC    QM C CALLABLE SHORT INTERFACE PROGRAM
DSQCICE   QM C CALLABLE EXTENDED INTERFACE PROGRAM
DSQCOMMB  QUERY MANAGEMENT COBOL CPI INCLUDE___
DSQCOMMR  QX INCLUDE MEMBER FOR RPG
DSQDEV    GDDM ENTRY MODULE
DSQUID    GDDM ENTRY MODULE
DSQUSE    GDDM ENTRY MODULE
DSRNIT    GDDM ENTRY MODULE
DSUSE     GDDM ENTRY MODULE
EALRTVA   ARRAYS FOR QALRTVA RPGINC
ECONV     ARRAY FOR ICONV
EDBLDBR   EDBLDBR API HEADER IN RPG
EDBRTVFD  EDBRTVFD API HEADER IN RPG
EDCRBODY  BODY STREAM PROCESSING FOR INLINER
EDCRCALL  CALL PROCESSING FOR INLINER
EDCRHEAD  HEADER STREAM PROCESSING FOR INLINER
EDCRMAIN  MAIN ENTRY POINT TO W-CODE INLINER
EDCRMISC  MISCELLANEOUS INLINER FUNCTIONS
EDCRPORD  POST ORDER PROCESSING FOR INLINER
EDCRSHAD  SHADOW GENERATION FOR INLINER
EESRSRVA  EESRSRVA API HEADER IN RPG
EFVLSTA   LIST ACTIVITIES
EFZLAAOA  TOKEN LIST UTILITY SOURCE FILES
EFZLABOA  LINGUISTIC SERVICE LIBRARY ROUTINES
EFZLACOA  OVERALL ACTIVATE DICTIONARY FUNCTION
EFZLBDOA  DANISH ABBREVIATION LIST
EFZLBEOA  SPANISH ABBREVIATION LIST
EFZLBFOA  FRENCH ABBREVIATION LIST
EFZLBGOA  GERMANIC ABBREVIATION LIST
EFZLBHOA  DUTCH ABBREVIATION LIST
EFZLBIOA  ITALIAN ABBREVIATION LIST
EFZLBKOA  SWITCHER
EFZLBNOA  NORWEGIAN ABBREVIATION LIST
EFZLBSOA  SWEDISH ABBREVIATION LIST
EFZLBTOA  TURKISH
EFZLBUOA  US-ENGLISH ABBREVIATION LIST
EFZLCNOA  TOKEN TO 'S'-FORMAT DATA ELEMENT CONVERT
EFZLCOOA  COORDINATOR 0
EFZLC1OA  COORDINATOR 1
EFZLC2OA  COORDINATOR 2
EFZLC3OA  COORDINATOR 3
EFZLC4OA  COORDINATOR 4 SCAFFOLDING
EFZLDEOA  EFZLDEAA_DEACT - DEACTIVATE DICTS & ADDS
EFZLDIOA  SYSTEM DICTIONARY ACTIVATE ROUTINE
EFZLD4OA  COORDINATOR 4 MODULE
EFZLE4OA  COORDINATOR 4
EFZLF4OA  COORDINATOR 4 MODULE
EFZLGIOA  GENERATE INFLECTED FORMS
EFZLG4OA  COORDINATOR 4 MODULE
EFZLH4OA  COORDINATOR 4 MODULE
EFZLISOA  SIMPLE TOKENIZATION SOURCE FILE
EFZLI4OA  COORDINATOR 4 MODULE
EFZLMAIN  SWITCHER
EFZLMBOA  GET MORPHOLOGY PARADIGM INFORMATION
EFZLMB1A  MORPHOLOGY PREFIX PROCESSING
EFZLMB2A  GET FORM IDS AND ENDING STRINGS
EFZLMB3A  MORPHOLOGY RULE PROCESSING
EFZLMB4A  MORPHOLOGY FORMID SPELLING EXPANSION
EFZLMB5A  MATCH A WORD WITH THE ENDING LIST
EFZLMB6A  MORPHOLOGY OUTPUT DATA
EFZLMB7A  RUN LENGTH ENCODING FOR MORPHOLOGY
EFZLMB8A  LOAD MORPHOLOGY TRANSFORMATION RULES
EFZLMEOA  MEMORY MANAGEMENT SOURCE FILE
EFZLMIOA  MORPHOLOGY ID
EFZLNLPS  SWITCHER
EFZLNOOA  WORD NORMALIZATION
EFZLPTOA  TAP UTILITIES FOR PROPERTY-RELATED INFO
EFZLSBOA  C VERSION OF SRCHBLK AND RELATED FUNCS
EFZLSFOA  STUBS FOR SYN & MORPH IN PC-LEXAM
EFZLSHOA  DAP TO PC-LEXAM SHELL CODE
EFZLSYOA  SYNONYM AID MAIN ENTRY
EFZLSY1A  P_SRCHBLK FOR SYNONYMS
EFZLSY2A  PERFORMS SYNONYM ADD SUFFIX FUNCTION
EFZLS4OA  COORDINATOR 4 MODULE
EFZLTMOA  TAP MANAGER SOURCE FILE
EFZLTSOA  TEXT SEGMENT IDENTIFICATION SOURCE FILE
EFZLX0OA  CORE ROUTINES FOR COMPLEX TOKEN ANALYSIS
EFZLX1OA  ENGLISH STUFF FOR COMPLEX TOKEN ANALYSIS
EFZLX2OA  NON-ENGLISH CMPLX TKN ANALYSIS ROUTINES
EFZLX3OA  UTILITIES FOR COMPLEX TOKEN ANALYSIS
EFZLZDOA  P_SRCHDCT
EFZLZD1A  P_CHKWRD
EFZLZD2A  PARAMETERIZED GETBLK
EFZLZD3A  P_DL_CHK DICTIONARY LIST CHECK
EFZLZD4A  P_NXTNIB GET NEXT NIBBLE
EFZLZD5A  P_NXTBYT GET NEXT BYTE
EFZLZD6A  P_RTNWRD GET RETURN WORD
EFZLZD7A  P_ADDLET<> ADD LETTER
EFZLZD7B  P_MADDLE<> ADD LETTER FOR MORPHOL
EHF       ARRAYS FOR QHF RPGINC
EHFRDDR   ARRAYS FOR QHFRDDR RPGINC
EKICONR   CSTATUS PRINT MANAGER RPG INCLUDE
ELGSORT   ARRAYS FOR QLGSORT
ELGSRTIO  ARRYS FOR QLGSRTIO
EMHLJOBL  ARRAYS FOR QMHLJOBL API
EMHLSTM   ARRAYS FOR QMHLSTM API
EMHRTVM   ARRAYS FOR QMHRTVM
ENMRGFN   ENMRGFN HEADER IN RPG
EOGDOCH   EOGDOCH HEADER FOR CBL
EOGDOCH   EOGDOCH API HEADER IN RPG
EOGDOCH   EOGDOCH HEADER IN ILE/RPG
EOGDOCH   EOGDOCH HEADER IN ILE/COBOL
EOGDOCH1  EOGDOCH1 API HEADER FOR CBL
EOGDOCH1  EOGDOCH1 API HEADER IN RPG
EOGDOCH1  EOGDOCH1 HEADER IN ILE/RPG
EOGDOCH1  EOGDOCH1 HEADER IN ILE/COBOL
EOGDOCH2  EOGDOCH2 API HEADER FOR CBL
EOGDOCH2  EOGDOCH2 API HEADER IN RPG
EOGDOCH2  EOGDOCH2 HEADER IN ILE/RPG
EOGDOCH2  EOGDOCH2 HEADER IN ILE/COBOL
EOGDOCH3  EOGDOCH3 API HEADER FOR CBL
EOGDOCH3  EOGDOCH3 API HEADER IN RPG
EOGDOCH3  EOGDOCH3 HEADER IN ILE/RPG
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EOGDOCH3  EOGDOCH3 HEADER IN ILE/COBOL
EOGDOCH4  EOGDOCH4 API HEADER FOR CBL
EOGDOCH4  EOGDOCH4 API HEADER IN RPG
EOGDOCH4  EOGDOCH4 HEADER IN ILE/RPG
EOGDOCH4  EOGDOCH4 HEADER IN ILE/COBOL
EOGDOCH5  EOGDOCH5 API HEADER FOR CBL
EOGDOCH5  EOGDOCH5 API HEADER IN RPG
EOGDOCH5  EOGDOCH5 HEADER IN ILE/RPG
EOGDOCH5  EOGDOCH5 HEADER IN ILE/COBOL
EOGDOCH6  EOGDOCH6 API HEADER FOR CBL
EOGDOCH6  EOGDOCH6 API HEADER IN RPG
EOGDOCH6  EOGDOCH6 HEADER IN ILE/RPG
EOGDOCH6  EOGDOCH6 HEADER IN ILE/COBOL
EOGDOCH7  EOGDOCH7 API HEADER FOR CBL
EOGDOCH7  EOGDOCH7 API HEADER IN RPG
EOGDOCH7  EOGDOCH7 HEADER IN ILE/RPG
EOGDOCH7  EOGDOCH7 HEADER IN ILE/COBOL
EOGDOCH9  EOGDOCH9 API HEADER FOR CBL
EOGDOCH9  EOGDOCH9 API HEADER IN RPG
EOGDOCH9  EOGDOCH9 HEADER IN ILE/RPG
EOGDOCH9  EOGDOCH9 HEADER IN ILE/COBOL
EOK       EOK API HEADER FOR CBL
EOK       EOK API HEADER IN RPG
EOK       EOK HEADER IN ILE/RPG
EOK       EOK HEADER IN ILE/COBOL
EOKDRSH1  EOKDRSH1 API HEADER FOR CBL
EOKDRSP   EOKDRSP API HEADER FOR CBL
EOKDRSP   EOKDRSP  API HEADER IN RPG
EOKDRSP   EOKDRSP  HEADER IN ILE/RPG
EOKDRSP   EOKDRSP1 HEADER IN ILE/COBOL
EOKDRSP1  EOKDRSP1 API HEADER FOR CBL
EOKDRSP1  EOKDRSP1 API HEADER IN RPG
EOKDRSP1  EOKDRSP1 HEADER IN ILE/RPG
EOKDRSP1  EOKDRSP1 HEADER IN ILE/COBOL
EOKDRSP2  EOKDRSP2 API HEADER FOR CBL
EOKDRSP2  EOKDRSP2 API HEADER IN RPG
EOKDRSP2  EOKDRSP2 HEADER IN ILE/RPG
EOKDRSP2  EOKDRSP2 HEADER IN ILE/COBOL
EOKDRSP3  EOKDRSP3 API HEADER FOR CBL
EOKDRSP3  EOKDRSP3 API HEADER IN RPG
EOKDRSP3  EOKDRSP3 HEADER IN ILE/RPG
EOKDRSP3  EOKDRSP3 HEADER IN ILE/COBOL
EOKDRVF   EOKDRVF  API HEADER FOR CBL
EOKDRVF   EOKDRVF  API HEADER IN RPG
EOKDRVF   EOKDRVF  HEADER IN ILE/RPG
EOKDRVF   EOKDRVF1 HEADER IN ILE/COBOL
EOKDRVF1  EOKDRVF1 API HEADER FOR CBL
EOKDRVF1  EOKDRVF1 API HEADER IN RPG
EOKDRVF1  EOKDRVF1 HEADER IN ILE/RPG
EOKDRVF1  EOKDRVF1 HEADER IN ILE/COBOL
EOKDRVF2  EOKDRVF2 API HEADER FOR CBL
EOKDRVF2  EOKDRVF2 API HEADER IN RPG
EOKDRVF2  EOKDRVF2 HEADER IN ILE/RPG
EOKDRVF2  EOKDRVF2 HEADER IN ILE/COBOL
EOKDRVF3  EOKDRVF3 API HEADER FOR CBL
EOKDRVF3  EOKDRVF3 API HEADER IN RPG
EOKDRVF3  EOKDRVF3 HEADER IN ILE/RPG
EOKDRVF3  EOKDRVF3 HEADER IN ILE/COBOL
EPDTRCJB  EPDTRCJB HEADER FOR CBL
EPDTRCJB  EPDTRCJB HEADER IN RPG
EPDTRCJB  EPDTRCJB HEADER IN ILE/RPG
EPDTRCJB  EPDTRCJB HEADER IN ILE/COBOL
EQQQRY    EQQQRY HEADER IN RPG
ERCJOB    ERCJOB HEADER IN RPG
ESPBLSEP  ESPBLSEP API HEADER FOR CBL
ESPBLSEP  ESPBLSEP API HEADER IN RPG
ESPBLSEP  ESPBLSEP HEADER IN ILE/RPG
ESPBLSEP  ESPBLSEP HEADER IN ILE/COBOL
ESYLAUTU  LIST AUTHORIZED USERS ARRAY
ETASTGEX  ETASTGEX EXIT PROGRAM
ETASTGEX  ETASTGEX EXIT PROGRAM
ETASTGEX  ETASTGEX EXIT PROGRAM
ETATAPMG  ETATAPMG API HEADER IN RPG
ETATAPMG  ETATAPMG
ETATAPMG  ETATAPMG HEADER IN ILE/COBOL
ETERTVPV  ETERTVPV HEADER IN RPG
ETNCMTRB  ETNCMTRB EXIT PROGRAM HEADER
ETNCMTRB  ETNCMTRB EXIT PROGRAM HEADER
ETNCMTRB  ETNCMTRB HEADER IN ILE/RPG
ETNCMTRB  ETNCMTRB HEADER IN ILE/COBOL
EUIAFEX   EUIAFEX API HEADER FOR CBL
EUIAFEX   EUIAFEX HEADER IN ILE/RPG
EUIAFEX   EUIAFEX HEADER IN ILE/COBOL
EUIAFEX   QSYATUS OT-EUIAFEX API HEADER IN RPG
EUIALCL   EUIALCL API HEADER FOR CBL
EUIALCL   EUIALCL HEADER IN ILE/RPG
EUIALCL   EUIALCL HEADER IN ILE/COBOL
EUIALCL   QSYATUS OT-EUIALCL API HEADER IN RPG
EUIALEX   EUIALEX API HEADER FOR CBL
EUIALEX   EUIALEX HEADER IN ILE/RPG
EUIALEX   EUIALEX HEADER IN ILE/COBOL
EUIALEX   QSYATUS OT-EUIALEX API HEADER IN RPG
EUICSEX   EUICSEX API HEADER FOR CBL
EUICSEX   EUICSEX HEADER IN ILE/RPG
EUICSEX   EUICSEX HEADER IN ILE/COBOL
EUICSEX   QSYATUS OT-EUICSEX API HEADER IN RPG
EUIFKCL   EUIFKCL API HEADER FOR CBL
EUIFKCL   EUIFKCL HEADER IN ILE/RPG
EUIFKCL   EUIFKCL HEADER IN ILE/COBOL
EUIFKCL   QSYATUS OT-EUIFKCL API HEADER IN RPG
EUIGPEX   EUIGPEX API HEADER FOR CBL
EUIGPEX   EUIGPEX HEADER IN ILE/RPG
EUIGPEX   EUIGPEX HEADER IN ILE/COBOL
EUIGPEX   QSYATUS OT-EUIGPEX API HEADER IN RPG
EUIILEX   EUIILEX API HEADER FOR CBL
EUIILEX   EUIILEX HEADER IN ILE/RPG
EUIILEX   EUIILEX HEADER IN ILE/COBOL
EUIILEX   QSYATUS OT-EUIILEX API HEADER IN RPG
EUIMICL   EUIMICL API HEADER FOR CBL
EUIMICL   EUIMICL HEADER IN ILE/RPG
EUIMICL   EUIMICL HEADER IN ILE/COBOL
EUIMICL   QSYATUS OT-EUIMICL API HEADER IN RPG
EUITAEX   EUITAEX API HEADER FOR CBL
EUITAEX   EUITAEX HEADER IN ILE/RPG
EUITAEX   EUITAEX HEADER IN ILE/COBOL
EUITAEX   QSYATUS OT-EUITAEX API HEADER IN RPG
EUSREG    ARRAYS FOR QUSREG RPGINC
EUSRMBRD  EUSRMBRD API HEADER IN RPG
EUSRSPLA  EUSRSPLA HEADER IN RPG
FINDPRF   FROM PC LEXAM MERGE CODE
FINHYPH   FROM PC LEXAM MERGE CODE
FSALRM    GDDM ENTRY MODULE
FSEXIT    GDDM ENTRY MODULE
FSFRCE    GDDM ENTRY MODULE
FSINIT    GDDM ENTRY MODULE
FSPCLR    GDDM ENTRY MODULE
FSPCRT    GDDM ENTRY MODULE
FSPDEL    GDDM ENTRY MODULE
FSPQRY    GDDM ENTRY MODULE
FSPSEL    GDDM ENTRY MODULE
FSQCPG    GDDM ENTRY MODULE
FSQDEV    GDDM ENTRY MODULE
FSQERR    GDDM ENTRY MODULE
FSQUPG    GDDM ENTRY MODULE
FSREST    GDDM ENTRY MODULE
FSRNIT    GDDM ENTRY MODULE
FSTERM    GDDM ENTRY MODULE
GETBLK2   FROM PC LEXAM MERGE CODE
GSARC     GDDM ENTRY MODULE
GSAREA    GDDM ENTRY MODULE
GSCA      GDDM ENTRY MODULE
GSCB      GDDM ENTRY MODULE
GSCD      GDDM ENTRY MODULE
GSCH      GDDM ENTRY MODULE
GSCHAP    GDDM ENTRY MODULE
GSCHAR    GDDM ENTRY MODULE
GSCLP     GDDM ENTRY MODULE
GSCLR     GDDM ENTRY MODULE
GSCM      GDDM ENTRY MODULE
GSCOL     GDDM ENTRY MODULE
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GSCS      GDDM ENTRY MODULE
GSCT      GD - SELECT COLOR TABLE ENTRY MODULE
GSCTD     GD - DEFINE COLOR TABLE ENTRY MODULE
GSELPS    GDDM ENTRY MODULE
GSENDA    GDDM ENTRY MODULE
GSFLD     GDDM ENTRY MODULE
GSFLW     GDDM ENTRY MODULE
GSGET     GDDM ENTRY MODULE FOR GSGET
GSGETE    GDDM ENTRY MODULE FOR GSGETE
GSGETS    GDDM ENTRY MODULE FOR GSGETS
GSIMG     GDDM ENTRY MODULE
GSIMGS    GDDM ENTRY MODULE
GSLINE    GDDM ENTRY MODULE
GSLSS     GDDM ENTRY MODULE
GSLT      GDDM ENTRY MODULE
GSLW      GDDM ENTRY MODULE
GSMARK    GDDM ENTRY MODULE
GSMIX     GDDM ENTRY MODULE
GSMOVE    GDDM ENTRY MODULE
GSMRKS    GDDM ENTRY MODULE
GSMS      GDDM ENTRY MODULE
GSMSC     GDDM ENTRY MODULE
GSPAT     GDDM ENTRY MODULE
GSPFLT    GDDM ENTRY MODULE
GSPLNE    GDDM ENTRY MODULE
GSPS      GDDM ENTRY MODULE
GSPUT     GDDM ENTRY MODULE FOR GSGETS
GSQCA     GDDM ENTRY MODULE
GSQCB     GDDM ENTRY MODULE
GSQCD     GDDM ENTRY MODULE
GSQCEL    GDDM ENTRY MODULE
GSQCH     GDDM ENTRY MODULE
GSQCLP    GDDM ENTRY MODULE
GSQCM     GDDM ENTRY MODULE
GSQCOL    GDDM ENTRY MODULE
GSQCP     GDDM ENTRY MODULE
GSQCS     GDDM ENTRY MODULE
GSQCT     GD - QUERY CURRENT COLOR TABLE MODULE
GSQCTD    GD - QUERY COLOR TABLE ENTRY MODULE
GSQCUR    GDDM ENTRY MODULE
GSQFLW    GDDM ENTRY MODULE
GSQLT     GDDM ENTRY MODULE
GSQLW     GDDM ENTRY MODULE
GSQMAX    GDDM ENTRY MODULE
GSQMIX    GDDM ENTRY MODULE
GSQMS     GDDM ENTRY MODULE
GSQMSC    GDDM ENTRY MODULE
GSQNSS    GDDM ENTRY MODULE
GSQPAT    GDDM ENTRY MODULE
GSQPS     GDDM ENTRY MODULE
GSQSEN    GDDM ENTRY MODULE
GSQSS     GDDM ENTRY MODULE
GSQTB     GDDM ENTRY MODULE
GSQVIE    GDDM ENTRY MODULE
GSQWIN    GDDM ENTRY MODULE
GSRSS     GDDM ENTRY MODULE
GSSCLS    GDDM ENTRY MODULE
GSSDEL    GDDM ENTRY MODULE
GSSEG     GDDM ENTRY MODULE
GSSEN     GDDM ENTRY MODULE
GSVECM    GDDM ENTRY MODULE
GSVIEW    GDDM ENTRY MODULE
GSWIN     GDDM ENTRY MODULE
HYPHRIL   RULE INTERPRETER FOR HYPH/PHON RULES__
ICONV     ICONV    API HEADER IN RPG
ICONV     ICONV   HEADER IN ILE/RPG
ICONV     ICONV    HEADER IN ILE/COBOL
IXXBLT    IXXBLT COMMON CODE SOURCE
IXXBLT1   IXXBLT1 COMMON CODE SOURCE
IXXBLT2   IXXBLT2 COMMON CODE SOURCE
IXXBLT3   IXXBLT3 COMMON CODE SOURCE
IXXBLT4   IXXBLT4 COMMON CODE SOURCE
IXXBLT5   IXXBLT5 COMMON CODE SOURCE
IXXCONST  CONSTANT DECLARES FOR KERNAL
IXXDBCS   IXXDBCS COMMON CODE SOURCE
IXXDBEBC  IXXDBEBC COMMON CODE SOURCE
IXXDICT   IXXDICT COMMON CODE SOURCE
IXXEXPR   IXXEXPR COMMON CODE SOURCE
IXXFLOAT  IXXFLOAT COMMON CODE SOURCE
IXXHPRNT  IXXHPRNT COMMON CODE SOURCE
IXXHUGE   IXXHUGE COMMON CODE SOURCE
IXXHUGEB  IXXHUGEB COMMON CODE SOURCE
IXXINSTR  IXXINSTR COMMON CODE SOURCE
IXXINTRP  IXXINTRP COMMON CODE SOURCE
IXXJMP    IXXJMP COMMON CODE SOURCE
IXXLIT    IXXLIT COMMON CODE SOURCE
IXXMISC   IXXMISC COMMON CODE SOURCE
IXXPARSE  IXXPARSE COMMON CODE SOURCE
IXXPCODE  IXXPCODE COMMON CODE SOURCE
IXXPRNTF  IXXPRNTF COMMON CODE SOURCE
IXXROUTN  IXXROUTN COMMON CODE SOURCE
IXXSIGNL  IXXSIGNL COMMON CODE SOURCE
IXXSTOP   IXXSTOP COMMON CODE SOURCE
IXXTCODE  IXXTCODE COMMON CODE SOURCE
IXXTOKEN  IXXTOKEN COMMON CODE SOURCE
IXXTOKNZ  IXXTOKNZ COMMON CODE SOURCE
IXXTRACE  IXXTRACE COMMON CODE SOURCE
LETTREM   FROM PC LEXAM MERGE CODE
LEXAM     FROM PC LEXAM MERGE CODE
LXCBSRCH  SYSTEM DICTIONARY ACTIVATE ROUTINE__
PARSER2   FROM PC LEXAM MERGE CODE
PARTS2    PARTOFSP
PITHC     A C VERSION OF PITH BY IVAN WALKER
PORT      SWITCHER
PRSRTSS   FROM PC LEXAM MERGE CODE
PRTAPI    COBOL PRINTER OPTION SUBROUTINE
PRTBAR    COBOL BARCODE OPTION SUBROUTINE
PRTGRC    COBOL GRAPHICS OPTION SUBROUTINE
PVCJHAT   C SOURCE FOR PMCJMAIN; USED BY ALL PVCJ*
PVCJMAIN  C2 POINTER VERIFICATION C TC DRIVER
QACCLOSE  ICF-APPC CLOSE
QACDEVSL  APPC DEVICE SELECTION FUNCTION
QACEFEVH  ICF-APPC EXPEDITED FLOW EVENT HANDLER
QACERP1   ICF-APPC AP ERROR HANDLER
QACERP2   ICF-APPC FM ERROR HANDLER
QACFMH7   ICF-APPC FMH7 HANDLER
QACGET    ICF-APPC GET
QACINASP  ICF-APPC INITIALIZE PUT ASSOCIATED SPACE
QACIOCMP  ICF-APPC REQIO COMPLETION HANDLER
QACNFEVH  ICF-APPC NORMAL FLOW EVENT HANDLER
QACOPEN   ICF-APPC OPEN FILE
QACPSR    ICF-APPC PROGRAM START REQUEST MAINLINE
QACPSRIO  ICF-APPC PSR REQIO COMPLETION HANDLER
QACPUT    ICF-APPC PUT
QACRSP    ICF-APPC SEND RESPONSE
QACRSUME  AC FM MRT/RUF RESUME
QACRVPIP  ICF-APPC RECEIVE PIP DATA
QACSOTP   APPC SIGN-ON TRANSACTION PROGRAM
QACSUSPD  AC FM MRT/RUF SUSPEND
QACTPP    ICF-APPC TERMINATION CLOSE
QACVRYOF  ICF-APPC VARY OFF
QACVRYON  ICF-APPC VARY ON
QAEAPPL   NEW CSP AEF STUB PROGRAM
QAECHKA   PRINT CSP/AE APPLICATION
QAECHPGM  CHANGE CSP/AE PROGRAM
QAECHPOP  PROMPT OVERRIDE PGM FOR CHGCSPXXX
QAECRTM   CPP FOR CREATE CSP/AE USER MESSAGE FILE
QAECRTO   CREATE CSP/AE OBJECTS
QAECVTPG  THIS IS A SHARED PART
QAEDBIO   DATA BASE I/O FUNCTIONS
QAEDSPO   DISPLAY CSP/AE OBJECTS
QAEDSPRT  THIS IS A SHARED PART
QAEDYNAT  DYNAMIC TRACE SELECTION ROUTINE
QAEFMSRV  FORMAT MANAGEMENT PROGRAM
QAEINIT   INIT AND TERMINATE AEF
QAEINST   THIS IS A SHARED PART
QAEROUTE  THIS IS A SHARED PART
QAESQLIO  SQL DATA BASE SERVICE
QAESQL97  BUILD SQL AREA
QAESTORG  AEF STORAGE MANAGER
```

QAESTRA	TRACE CSP/AE APPLICATIONS
QAESTUB	CSP AEF STUB PROGRAM
QAESTUB3	CSP AEF POST R2 STUB PROGRAM
QAETRACE	CSP / AE TRACE MODULE
QAEUDLT	HANDLES DELETE CONFIRMATION
QAEUMM	CSP/AE UTILITIES MAIN MENU
QAEUM124	CSP/AE UTILITY OPTIONS 1,2 AND F18
QAEUTST	HANDLES OPTS FROM WRKCSPOBJ
QAEUWWE	WORK WITH CSP/AE OBJECTS
QAGC10	MODULUS 10 CHECK
QAGC11	MODULUS 11 CHECK
QAGG10	MODULUS 10 GENERATION
QAGG11	MODULUS 11 GENERATION
QALAALRD	COMMAND PROCESSOR FOR THE ADDALRD CMD
QALALRAD	EXIT PROGRAM FOR WRKALR PANEL PROCESSING
QALALREH	ALERT EVENT HANDLER
QALCADPX	CHGALRD PROMPTER EXIT PROGRAM
QALCALRD	COMMAND PROCESSOR FOR THE CHGALRD CMD
QALCATPX	CHGALRTBL PROMPTER EXIT PROGRAM
QALCHGAL	WRKALR PROCESSING - CHANGE ALERT
QALCHGFP	CHANGE FOCAL POINT
QALDLTAC	DLTALR DELETE ALERT - CPP
QALDLTAL	DELETE ALERT PGM WRKALR PANEL PROCESSING
QALDSPDT	DSP ALERT DETAIL WRKALR PANEL PROCESSING
QALDSPDY	DISPLAY ALERTS DYNAMIC
QALDSPHX	DSP ALERT IN HEX WRKALR PANEL PROCESSING
QALDSPMN	DSP DETAIL MENU WRKALR DETAIL PROCESSING
QALDSPRA	DSP ALERT RECOMMENDED ACTIONS WRKALR PRC
QALDTCOR	MSU CORRELATORS WRKALR DETAIL PROCESSING
QALDTHRL	ALERT DETAIL - HIERARCHY/RESOURCE LIST
QALDTLAN	ALERT DETAIL - LAN LINK DATA
QALDTPRD	ALERT DETAIL - PRODUCT SET ID
QALDTSUP	ALERT DETAIL - SUPPORTING DATA
QALDTSYM	ALERT DETAIL - SYMPTOM STRING
QALDTTIM	ALERT DETAIL - DATE/TIME
QALDTTXT	ALERT DETAIL - TEXT MESSAGE
QALFRAAE	COMMAND PROCESSOR FOR THE ADDALRACNE CMD
QALFRAPX	PROMPTER EXIT FOR THE CHGALRACNE COMMAND
QALFRAVL	VALIDATION ROUTINE FOR ADDALRSLTE
QALFRCAE	COMMAND PROCESSOR FOR THE CHGALRACNE CMD
QALFRCVL	VALIDATION ROUTINE FOR CHGALRSLTE
QALFRVAE	ALERT FILTER ACTION ENTRIES VALIDITY CHK
QALFRVAP	PARAMETER VALIDATION FOR ADD/CHG ALRACNE
QALGADSC	GET ALERT DESCRIPTION
QALGDTLQ	GET ALERT DETAIL QUALFIERS
QALGENA	GENERATE ALERT API
QALGTDTA	GET ALERT DATA FROM ALRTDTA
QALINEXT	EXIT PROGRAM FOR AL FILE CHANGES
QALMGR	ALERT MANAGER MAIN MODULE
QALPRALR	WRKALR PRINT PROCESSING
QALQRYAF	QUERY ALERT FILE
QALRALRD	COMMAND PROCESSOR FOR THE RMVALRD CMD
QALRPTAN	REPORT ANALYSIS RESULTS - ?RPTANZ MACRO
QALRTVA	QALRTVA API HEADER FOR CBL
QALRTVA	RETRIEVE ALERT API
QALRTVA	QALRTVA API HEADER IN RPG
QALRTVA	QALRTVA HEADER IN ILE/RPG
QALRTVA	QALRTVA HEADER IN ILE/COBOL
QALSGNAL	SIGNAL ALERT
QALSNDA	SEND ALERT API
QALSNDAL	SEND ALERT
QALSUBSA	SUBSET ALERTS CLEANUP FUNCTION
QALSYSEH	SYSTEM ALERT EVENT HANDLER
QALWADDA	DSP REC ACTIONS WRKALRD PNL PROCESSING
QALWADDT	DSP ALERT DETAIL WRKALRD PNL PROCESSING
QALWADEX	EXIT PROGRAM WRKALRD PANEL PROCESSING
QALWADPR	PRT ALERT DETAIL WRKALRD PNL PROCESSING
QALWALRD	WORK WITH ALERT DESCRIPTIONS CPP
QALWKALR	WORK WITH ALERTS CPP
QALWKALV	WRKALR VIEW HANDLING PROGRAM
QALWKPRB	CONNECT AL TO SX WKRPRB
QAPALCON	QAPALCON--ALLOCATE CONVERSATION
QAPALSND	QAPALSND--ALLOW SEND
QAPCANCL	QAPCANCL--CANCEL OUTSTANDING I/O
QAPCRTRB	CREATE RBS
QAPDEQUE	QAPDEQUE--DEQUEUE REQUEST I/O
QAPDLCON	QAPDLCON--DEALLOCATE CONVERSATION
QAPDSMOD	DISABLE OTHER MODULES
QAPDTACH	QAPDTACH--DETACH PROGRAM
QAPERROR	QAPERROR--QUEUE DESTROYED EXCP HANDLER
QAPEVOKE	QAPEVOKE--EVOKE PROGRAM
QAPGTSES	QAPGTSES--GET SESSION
QAPIOCMP	QAPIOCMP--I/O COMPLETION EVENT HANDLER
QAPRCV	QAPRCV--RECEIVE DATA
QAPRSPPS	QAPRSPPS--SEND POSITIVE RESPONSE
QAPRSTRB	RESET REQUEST BLOCKS
QAPSNDER	QAPSNDER--SEND ERROR DATA
QAPSNDMG	SEND MESSAGES TO CALLER
QAPSNDSG	QAPSNDSG--SEND SIGNAL DATA
QAPSNDTA	APSNDTA--SEND APPLICATION DATA
QAPUIEH	QAPUIEH--UNSOLICIT DATA EVENT HANDLER
QAPWAIT	QAPWAIT--WAIT FOR INPUT
QAPXMT	QAPXMT--TRANSMIT
QARCATTR	COLOR DISPLAY ATTRIBUTES
QARCFIGL	ARCTIC LOCAL CONFIGURATION DATA
QARCFIGR	ARCTIC REMOTE CONFIGURATION DATA
QARCHAR	DISPLAYABLE CHARACTERS
QARCONVT	CONSOLE TO ARCTIC DATA CONVERSION
QARDEVSL	ERAP DEVICE SELECTION PROMPT
QARERAP	ERAP OPTIONS
QARERHST	ERROR HISTORY TABLES
QAREVINP	TERMINAL INPUT EVENT HANDLER
QARFUNKY	COMMAND FUNCTION KEYS
QARGMENU	GRAPHICS VERIFICATION MENU
QARGPRNT	GRAPHICS PRINTER VERIFICATION
QARGPSEL	STUB
QARGVDO	VIDEO DEVICE SCREENS
QARG7372	IBM 7372 PLOTTER VERIFICATION
QARIPDS	QARIPDS
QARKCHAR	IDEOGRAPHIC DISPLAYABLE CHARACTERS
QAROUTSL	ERAP OUTPUT SELECTION
QARPRNT	5256 PRINT COMMAND MODULE
QARPSEL	PRINTER SELECTION
QARSPINP	SPECIFIED INPUT FIELDS
QARWSCO	CONSOLE TO ARCTIC DATA CONVERSION
QAR52IGC	IDEOGRAPHIC PRINTER VERIFICATION
QAR5219	QAR5219 PRINTER VERIFICATION MODULE
QAR5225	5256 PRINT COMMAND MODULE
QAR5256	5256 PRINT COMMAND MODULE
QA1CLOSE	INTRA CLOSE/RELEASE MODULE
QA1DEVSL	INTRA DEVICE SELECTION MODULE
QA1DTAEV	INTRA DATA AVAILABLE EVENT HANDLER
QA1ERP	INTRA ERROR HANDLER MODULE
QA1EVKEV	INTRA EVOKE EVENT HANDLER
QA1GET	INTRA GET MODULE
QA1INASP	INTRA INITIALIZE PUT ASSOC SPACE MODULE
QA1OPEN	INTRA OPEN/ACQUIRE MODULE
QA1PSR	INTRA PROCEDURE START REQUEST MODULE
QA1PUT	INTRA PUT MODULE
QA1RST	INTRA RESTORE MODULE
QA1SUSPD	INTRA SUSPEND MODULE
QA1VRYEV	INTRA VARY OFF EVENT HANDLER
QA1VRYOF	INTRA VARY OFF MODULE
QA1VRYON	INTRA VARY ON MODULE
QBIASYNC	BSCEL ASYNC EVENT HANDLER
QBIBID	BSCEL ASYNC EVENT HANDLER
QBICLOSE	BSCEL ASYNC EVENT HANDLER
QBIERP	BSCEL ASYNC EVENT HANDLER
QBIFSTIO	BSCEL ASYNC EVENT HANDLER
QBIGET	BSCEL ASYNC EVENT HANDLER
QBIOPEN	BSCEL ASYNC EVENT HANDLER
QBIPSR	BSCEL ASYNC EVENT HANDLER
QBIPUT	BSCEL ASYNC EVENT HANDLER
QBIPUTCP	BSCEL ASYNC EVENT HANDLER
QBIRST	BSCEL ASYNC EVENT HANDLER
QBISUSPD	BSCEL ASYNC EVENT HANDLER
QBLSS1OP	OPTIMIZATION EXIT FOR OS/400
QBMGZINS	BOOKMANAGER INSTALL EXIT PROGRAM
QBMRCDAT	BOOKMANAGER CNVDATE SPI
QBMRDLTS	BOOKMANAGER DLTSHF CPP

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QBMRRFSH  REFRESH A BOOKMANAGER BOOK
QBMRRSTS  CPP FOR RSTSHF COMMAND
QBMRSAVS  CPP FOR SAVSHF COMMAND
QBMRSRV   BOOKMANAGER SERVICES
QBMRVCP   BOOKMANAGER VALIDITY CHECK PROGRAM
QBNADDAS  ADD ASSOCIATED SPACE ENTRY API
QBNADDAT  ADD ATTRIBUTE OIR API
QBNADDBD  CPP: ADDBNDDIRE COMMAND PROGRAM
QBNADDBE  ADD BIND-TIME EXIT API
QBNADDVR  ADD VERSION INFORMATION API
QBNADDWH  ADD WHERE-USED OIR API
QBNASEXT  EXTEND ASSOCIATED SPACE ENTRY
QBNBXIXT  XPF BINDER CLEANUP AND IEXIT
QBNCHGMD  CHANGE MODULE CPP
QBNCHGSP  CPP: CHGSRVPGM COMMAND PROGRAM
QBNCPYOI  COPY OIR INFO FROM PROGRAMS
QBNCRTBD  CREATE BINDING DIRECTORY
QBNCRTBI  CRT BOUND OBJECT INTERFACE
QBNCRTBP  EVENTUAL API TO CREATE A PGM
QBNCRTPG  CRTPGM CPP
QBNCRTSP  CRTSRVPGM CPP
QBNDSPBD  DSPBNDDIR COMMAND PROGRAM
QBNDSPMD  DSPMOD COMMAND PROGRAM
QBNDSPPA  DSPPGM *MODULE PANEL ENTRY OPTION PGM
QBNDSPSP  CPP FOR DSPSRVPGM
QBNFFDC   XPF FFDC ROUTINE FOR MODULA-2
QBNGTOSV  GET OPERATING SYSTEM VERSION
QBNILBD   DSPBNDDIR INCOMPLETE LIST PROGRAM
QBNINSOB  INSERT OBJECT INTO LIBRARY
QBNINZPP  INITIALIZE PRE-PROCESSOR API
QBNLPGMI  API: LIST BOUND PROGRAM INFORMATION
QBNLPGMI  QBNLPGMI API HEADER FOR CBL
QBNLPGMI  QBNLPGMI API HEADER IN RPG
QBNLPGMI  QBNLPGMI HEADER IN ILE/RPG
QBNLPGMI  QBNLPGMI HEADER IN ILE/COBOL
QBNLSPGM  API: LIST SERVICE PROGRAM INFORMATION
QBNLSPGM  QBNLSPGM API HEADER FOR CBL
QBNLSPGM  QBNLSPGM API HEADER IN RPG
QBNLSPGM  QBNLSPGM HEADER IN ILE/RPG
QBNLSPGM  QBNLSPGM HEADER IN ILE/COBOL
QBNMDIXT  MODULE CREATION IEXIT ROUTINE
QBNPPCHK  CHECK FOR PRE-PROCESSOR DATA
QBNPPEDT  PROCESS PRE-PROCESSOR DATA
QBNREGPP  REGISTER PRE-PROCESSOR API
QBNRMVBD  CPP: RMVBNDDIRE COMMAND PROGRAM
QBNRSPGM  QBNRSPGM API HEADER FOR CBL
QBNRSPGM  RETRIEVE SERVICE PROGRAM INFORMATION API
QBNRSPGM  QBNRSPGM API HEADER IN RPG
QBNRSPGM  QBNRSPGM HEADER IN ILE/RPG
QBNRSPGM  QBNRSPGM HEADER IN ILE/COBOL
QBNRTVAS  RETRIEVE ASSOC SPACE SPI
QBNRTVCM  PROMPT OVERRIDE FOR CHGMOD CMD
QBNRTVOI  RETRIEVE OIR INFO FROM MODULES
QBNRTVSP  POP: CHGSRVPGM COMMAND
QBNUPDBP  SETUP SPI TO CALL QBNUPDAT /UPD<SRV>PGM/
QBNUPDPG  STUB MODULE FOR PTFING RPLMOD
QBNUPDSP  STUB MODULE FOR PTFING RPLMOD
QBNUXIXT  STUB MODULE FOR PTFING RPLMOD
QBNUXTRA  FIX PROGRAM INFO RETURNED TO QBNUPDBP
QBNVCABD  VALIDITY CHECKER FOR ADDBNDDIRE COMMAND
QBNVCCPG  VALIDITY CHECKER PGM FOR CRTPGM
QBNVCCSP  VALIDITY CHECKER PGM FOR CRTSRVPGM
QBNVCDMD  VALIDITY CHECKER PGM FOR DSPMOD
QBNVCDSP  DSPSRVPGM CMD VALIDITY CHECKER PROGRAM
QBNVCSPE  STRPGMEXP VALIDITY CHECKER
QBNVCUPG  STUB MODULE FOR PTFING RPLMOD
QBNVCUSP  STUB MODULE FOR PTFING RPLMOD
QBNWRKBE  CPP: WRKBNDDIRE COMMAND PROGRAM
QBNWRKEO  WRKBNDDIRE WORK PANEL ENTRY OPTION PGM
QBNXXIXT  QBNXMAIN IEXIT PROGRAM
QBSASYNC  BSC FM REQIO CMPLT EVENT HANDLER
QBSBID    BSC FM BID
QBSCLOSE  BSC FM CLOSE
QBSERP    BSC FM ERROR MESSAGE PROCESSOR
QBSFSTIO  BSC FM FIRST I/O FOR SWITCHED LINES
QBSGET    BSC FM GET
QBSINASP  BSC INITIALIZE LUD ASP
QBSOPEN   BSC FM OPEN
QBSPUT    BSC FM PUT
QBSPUTCP  BSC FM PUT COMPLETE
QCABIFV   QCABIFV
QCACALL   INTERPRETIVE CALL PROCESSING
QCACHECK  CHECK AND PROMPT FOR COMMAND
QCACHLBL  CHANGE LIBRARY LIST FOR COMMAND LEVEL
QCADRV    COMMAND ANALYZER DRIVER
QCADRV2   COMMAND ANALYZER DRIVER
QCAEXEC   HLL INTERFACE TO COMMAND EXECUTION
QCAFBIF   PROCESS BUILT-IN FUNCTION
QCAFCMD   PROCESS EMBEDDED COMMAND
QCAFEXPR  PROCESS EXPRESSION
QCAFLD    PARAMETER VALIDATION AND CONVERSION
QCAFSCAN  SCAN AND CLASSIFY CHARACTER TOKEN
QCAIEXIT  QCAIEXIT - INVOCATION EXIT FOR QCAEXEC
QCAIFLD   INTERPARAMETER CHECKING
QCAINCMD  UNSUPPORTED COMMAND CPP
QCANPARS  NATIVE SYNTAX PARSER ROUTINE
QCANPBLD  STUB MODULE FOR BUILDS
QCAPARSE  COMMAND STRING PARSER
QCAPCMD   API: NATIVE COMMAND ANALYZER FUNCTIONS
QCAPCMD   QCAPCMD HEADER IN ILE/COBOL
QCAPCMD   QCAPCMD API HEADER IN RPG
QCAPCMD   QCAPCMD HEADER IN ILE/RPG
QCAPCMD   QCAPCMD HEADER IN ILE/COBOL
QCAPOS    CREATE POSITIONAL LIST
QCAPRBLD  BUILD PARSER TABLE PROGRAM
QCARULE   LOCATE COMMAND DEFINITION OBJECT
QCASPCRT  QCASPCRT - CASQ MODULE
QCATRS    CREATE ARGLIST AND INVOKE VCP AND CPP
QCAXTND   EXTEND SPACE OBJECT
QCCOPDEV  HANDLE OPTIONS FOR REMOTE CONTROLLERS
QCCOPSYS  HANDLE OPTIONS FOR REMOTE SYSTEMS
QCCWRKCC  OA COMM CONFIG "WORK WITH" PANEL
QCDCCMD   CHGCMD COMMAND CPP
QCDCHDFT  CPP TO CHANGE KEYWORD DEFAULTS
QCDCHKCS  CHECK CDO CALL STATES
QCDCHKC2  CHECK THE C2 TOLERANCE BIT
QCDDCMD   DSPCMD COMMAND CPP
QCDRCMD   CRTCMD COMMAND CPP - DRIVER
QCDRCMDI  QCDRCMDI HEADER IN ILE/COBOL
QCDRCMDI  RETRIEVE COMMAND INFORMATION API
QCDRCMDI  QCDRCMDI API HEADER IN RPG
QCDRCMDI  QCDRCMDI HEADER IN ILE/RPG
QCDRCMDI  QCDRCMDI HEADER IN ILE/COBOL
QCDRNNM1  N TO N-1 OBJECT HANDLER FOR COMMANDS
QCDRPAS1  CRTCMD COMMAND - FIRST PASS
QCDRPAS2  CRTCMD COMMAND - THIRD PASS
QCDRPAS3  CRTCMD COMMAND - THIRD PASS
QCDRTVCV  CHGCMD COMMAND PROMPT OVERRIDE PROGRAM
QCDSETC2  SET CRTCDO2 BIT FOR THE BUILD GROUP
QCIACCIN  ACCEPT INPUT - S36 E
QCICNFIG  S/36 AUTO-CONFIGURATION OF DEVICES
QCICPYCC  PROMPTER EXIT PGM, FROMFILE ON SAVS36F
QCICPYCP  CPP FOR RSTS36F/SAVS36F CL COMMANDS
QCICPYEX  EXECUTION MAINLINE FOR RSTS36F/SAVS36F
QCICPYIO  I/O PROCESSING FOR RSTS36F/SAVS36F
QCICPYIX  INVOCATION EXIT PGM FOR RSTS36F/SAVS36F
QCICPYRA  RESTORE ALL EXECUTION FOR RSTS36F
QCICPYSA  SAVE ALL EXECUTION FOR SAVS36F CMD
QCICPYVL  PROMPTER VALIDATE PGM FOR SAVS36F
QCICRTF   CREATE SYSTEM/36-LIKE FILE
QCIDSPMA  DISPLAY PROGRAM ATTRIBUTES
QCIDSPPA  DISPLAY PROCEDURE ATTRIBUTES
QCIDSPSA  DISPLAY SOURCE ATTRIBUTES
QCIENDJB  M/36 END OF JOB
QCIGETUL  READ TAPE USER HEADER/TRAILER LABELS
QCIMBRCP  CPP FOR RSTS36LIBM/SAVS36LIBM COMMANDS
QCIMBREX  DRIVER MODULE FOR RSTS36LIBM/SAVS36LIBM
QCIMBRIO  I/O PROCESSING FOR RSTS36LIBM/SAVS36LIBM
QCIMBRIX  INVOC EXIT PGM FOR RSTS36LIBM/SAVS36LIBM
QCIMRT    S/36 EE ACQ/REL/IO/DATA HOOKS
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QCIMRTX EX - QCIMRT IEXIT ROUTINE
QCIMRT2 S/36 EE ACQ/REL/IO/DATA HOOKS (PART 2)
QCIOBCHK CHECK S/36 OBJECT EXISTENCE
QCIOPEN WS SEND PENDED INVITES
QCIOPEND S/36 ENV OPEN DISPLAY FILE
QCIOPENF S/36 ENV DATABASE FILE OPEN
QCIOPENP S/36 ENV PRINTER OPEN
QCIOPNDX EX - QCIOPEND IEXIT ROUTINE
QCIOPNFA M/36 OPEN CHECK FILE AUTHORIZATIONS
QCIPGMAT CHANGE OR EDIT S/36 PROGRAM ATTRIBUTES
QCIPMPOP PROMPT OVERRIDE PGM FOR CHGS36PGMA
QCIPRCAT CHG OR DSP PROCEDURE MBR ATTRIBUTES
QCIRTVPA RETRIVE PROCEDURE ATTRIBUTES
QCIRTVSA CHG/RETRIEVE SOURCE MBR ATTRIBUTES
QCISBSI MAKE STARTED SBS S/36 CAPABLE
QCISBSIX IEXIT ROUTINE FOR QCISBSI
QCISBST REMOVE S/36 CAPABLE SBS FROM S/36 ROSTER
QCISPPOP POP FOR CHGS36PRCA AND CHGS36SRCA
QCISRCAT CHANGE OR EDIT S/36 SOURCE ATTRIBUTES
QCJAEPM AS/400 EPM STUBS
QCJAGPTR RETREIVE PDG NAME FROM IUP
QCJASCB CREATE & DELETE AS400 CIPHER CONTROL BLK
QCJASFVR VERIFY MODCA DATA
QCJASTUB AS/400 C INTERFACE STUBS
QCJASYS AS/400 C SYSTEM SPECIFIC OPTION CODE
QCJBABRT CANCEL SPOOL FILE
QCJBCLOS CLOSE THE SPOOL FILE
QCJBCOPT CURRENT OPTIONS ENCAPSULATION FUNCTIONS
QCJBECHO ECHOS WHAT SPLWRITE CREATES TO A FILE
QCJBOPEN OPEN THE SPOOL FILE
QCJBRSRC INTERNAL RESOURCE PROCESSING
QCJBSCCA SCCA FUNCTIONS
QCJBWRIT WRITE TO THE SPOOL FILE
QCJCACCS SPOOL/LP-EDIT-SESSION ACCESS ROUTINES
QCJCAUTH CHECK USER AUTHORITY TO OBJECTS/FILES
QCJCDATC COMMON DATA CONVERSION ROUTINES
QCJCERRH PRTMGR ERROR VERBS/FUNCTIONS
QCJCFILE INTERNAL FILE I/O FUNCTIONS
QCJCGENP GENERAL PURPOSE ROUTINES
QCJCHGPR CHANGE PDG PROFILE
QCJCLPDQ COMMON DATA CONVERSION ROUTINES
QCJCMEMM MEMORY MANAGEMENT ROUTINES
QCJCPROC PRTMGR INIT AND TERMINATE
QCJCRTPD CREATE PRINT DESCRIPTOR GROUP
QCJCSTRC TRACE FACILITY GROUP
QCJCTRCE TRACE INITIALIZATION
QCJDEALL DESTROY AN AS/400 WRITE-PROTECTED SPACE
QCJDSPPN DISPLAY PDG OBJECT GROUP NAME
QCJDSPPR DISPLAY PDG PROFILE
QCJLBILD LP BUILD VERB
QCJLFILE LP FILE VERBS
QCJLGRPL GROUP LIST
QCJLIMEX LPIMPORT/LPEXPORT VERBS
QCJLOPTS PRD- LIST/QUERY/SET/DELETE -OPTIONS
QCJLREFS PRDQUERYREFLIST AND PRDSETREFLIST VERBS
QCJLSESS L P SESSION VERBS
QCJLUTIL PRDLIST AND PRDDELETE VERBS
QCJPBLKM LP BLOCK-TO-MEMORY FUNCTIONS
QCJPCLOS CLOSE AN AS400 OBJECT
QCJPCMPG PRD GROUP COMPRESSION FUNCTION
QCJPEMPT CHECK AN AS400 OBJECT FOR EMPTY STATE
QCJPGDIR PRD GROUP DIRECTORY FUNCTIONS
QCJPGIO PRD GROUP I/O FUNCTIONS
QCJPGRPL PRD GROUP LIST INTERNAL FUNCTIONS
QCJPMBLK LP MEMORY-TO-BLOCK LP FUNCTIONS
QCJPMERG COMMON DATA CONVERSION ROUTINES
QCJPOPEN OPEN AN AS400 OBJECT OR FILE
QCJPOPTS PRD LOW LEVEL OPT/REF/GRPLIST FUNCTIONS
QCJPRDBF PRD READ-PRD-FILE-TO-BUFFER FUNCTIONS
QCJPRDIM PRD IMPORT READ/TRANSLATE FUNCTIONS
QCJPREAD READ AN AS400 OBJECT
QCJPREFS COMMON DATA CONVERSION ROUTINES
QCJPROP CJ COMPONENT PROMPT OVERRIDE PROGRAM
QCJPSEEK SEEK IN AS400 OBJECT TO OFFSET
QCJPWRIT WRITE TO AN AS400 OBJECT
QCJPWTBF PRD WRITE-PRD SUPPORT FUNCTIONS
QCJPWTIM PRD EXPORT WRITE/CONVERT FUNCTIONS
QCJQHATM HANDLE ALLOCATION TABLE MANAGER
QCJQNCIR NON-C INTERFACE ROUTER
QCJQROUT EPM ROUTER
QCJRTVPR RETRIEVE PDG PROFILE
QCJSABRT PRTMGRABORT VERB
QCJSADOC PRTMGRADOC VERB
QCJSCLOS PRTMGRCLOSE VERB
QCJSEDOC SPLQMENDDOC VERB + ASSOCIATED FUNCTIONS
QCJSETPN SET PDG OBJECT GROUP NAMES
QCJSOPEN OPEN VERB AND SUBFUNCTIONS
QCJSOPT PRTMGRSETPRTOPT VERB AND FUNCTIONS
QCJSQOPT PRTMGR OPTIONS VERBS
QCJSSDOC PRTMGRSTARTDOC VERB
QCJSWFIL PRTMGRADDFILE VERB
QCJSWRIT PRTMGRWRITE VERB
QCJWPSRC CREATE AN AS/400 WRITE-PROTECTED SPACE
QCL INTERPRETIVE COMMAND LANG PROCESSOR
QCLBIFCN COMPILER: BUILT-IN FUNCTIONS MODULE
QCLCHEXT CPP: CHGPGM EXIT ROUTINE
QCLCHGPG CPP: CHGPGM COMMAND PROGRAM
QCLCHKBI VALIDATE BUILT-IN OPERANDS
QCLCHVAR PROCESS CHGVAR COMMAND
QCLCLCMD PROCESS CALL COMMAND
QCLCLCPR RUNTIME: CALL COMMAND PROCESSING
QCLCLNUP RUNTIME: CL PROGRAM CLEANUP ROUTINE
QCLCMDPR PROCESS COMMANDS
QCLCMPXH EXTERNAL EXCEPTION HANDLER
QCLCMXRF CPP: PRTCMDUSG COMMAND PROGRAM
QCLCNVCN RUNTIME: CONVERT CHAR TO NUMERIC
QCLCNVDT CPP: CVTDAT COMMAND PROGRAM
QCLCNVNC RUNTIME: CONVERT NUMERIC TO CHAR
QCLCPCMD PROCESS CALLPRC COMMAND
QCLCRPGM CREATE CL PROGRAM FROM IRP
QCLCVTML CONVERT CL SOURCE MAINLINE
QCLDECST DECLARE COMMAND & SYMBOL TABLE BUILD
QCLDESS CPP: CVTCLSRC COMMAND PROGRAM
QCLDMCMD DATA MANIPULATION COMMANDS
QCLDMDCL DATA MANIPULATION DECLARE
QCLDMFIN DATA MANIPULATION WRAPUP
QCLDMIO RUNTIME: DATA MANIPULATION I/O HANDLER
QCLDMWC RUNTIME: DATA MANIPULATION <WAIT,CNLRCV>
QCLDSPPG CPP: DSPPGM COMMAND PROGRAM
QCLDSPVC DSPPGM CMD VALIDITY CHECKER PROGRAM
QCLDSVST PROCESS DCLDTAARA COMMAND
QCLENTR ENTRY AND DRIVER PROGRAM
QCLERROR SEND MESSAGES MODULE
QCLGNEVL GENERATE EXPRESSIONS EVALUATOR
QCLGTCMD PROCESS GOTO COMMAND
QCLICP1 INITIAL COMMAND PROCESSING
QCLICP2 EXECUTABLE COMMAND PROCESSING
QCLIFCMD PROCESS IF COMMAND
QCLINIT INITIALIZATION ROUTINE
QCLIRPC GENERATE CODE <IRP> COMPLETION
QCLLSCMD PROCESS ELSE COMMAND
QCLMAP RUNTIME: RESOLUTION OF SPECIAL VALUES
QCLMNMSG PROCESS MONMSG COMMAND PHASE 1
QCLMSFIN PROCESS MONMSG COMMAND PHASE 2
QCLPRCMD GENERATE PROLOG CODE
QCLRDTAQ CLEAR DATA QUEUE
QCLREGCL GENERATE IRP FOR COMMANDS
QCLRPGAS RETRIEVE FROM ASSOCIATED SPACE API
QCLRPGMI QCLRPGMI HEADER IN ILE/COBOL
QCLRPGMI RETRIEVE PROGRAM INFO API
QCLRPGMI QCLRPGMI API HEADER IN RPG
QCLRPGMI QCLRPGMI HEADER IN ILE/RPG
QCLRPGMI QCLRPGMI HEADER IN ILE/COBOL
QCLRSLV RUNTIME: PROGRAM INITIALIZAION ROUTINE
QCLRSVRC PROCESS RCVDTAARA COMMAND
QCLRSVRE RUNTIME: PROCESS RCVDTAARA COMMAND
QCLRTNE RUNTIME: PROCESS RETURN COMMAND
QCLRTVCU CPP: RTVCLSRC COMMAND CLEAN-UP ROUTINE
QCLRTVCV POP: CHGPGM COMMAND
QCLRTVDA RETRIEVE DATA AREA COMMAND CPP

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QCLRTVDR  CPP: RTVCLSRC COMMAND DRIVER PROGRAM
QCLRTVEI  CPP: RTVCLSRC COMMAND EXTRACT PHASE
QCLRTVFS  CPP: RTVCLSRC COMMAND FORMAT PHASE
QCLRTVJA  RETRIEVE JOB ATTRIBUTES COMMAND
QCLRTVVI  CPP: RTVCLSRC COMMAND VALIDATE PHASE
QCLSCAN   API: SCAN FOR OCCURRENCE OF A STRING
QCLSPGAS  STORE IN ASSOCIATED SPACE API
QCLSSVRC  PROCESS SNDDTAARA COMMAND
QCLSSVRE  RUNTIME: PROCESS SNDDTAARA COMMAND
QCLSTOUT  SYMBOL TABLE OUTPUT
QCLSTRNG  CPP: CVTCLSRC COMMAND STRING CREATION
QCLSWTCH  RUNTIME: %SWITCH PROCESSOR
QCLWUIS   WHERE USED INFORMATION SAVE
QCLXCCMD  PROCESS TRFCTL COMMAND
QCLXCEXC  RUNTIME: TRFCTL CMD EXCEPTION HANDLER
QCLXDUMP  RUNTIME: CL PROGRAM DUMP ROUTINE
QCLXERR   RUNTIME: EXECUTION TIME ERROR HANDLER
QCMCNINF  WJ - CPIC DISPLAY CONNECTION INFO
QCMD      INTERPRETIVE COMMAND LANG PROCESSOR
QCMDCHK   CHECK AND PROMPT FOR COMMAND
QCMDEXC   HLL INTERFACE TO COMMAND EXECUTION
QCMIEXIT  WJ - CPI-C INVOCATION EXIT
QCMLSTEN  WJ - CPI-C BUILD LIST ENTRIES
QCMRCLRS  CPI-C RECLAIM RESOURCE
QCMREXX   INTERFACE BETWEEN REXX AND CPI-C
QCMTEXIT  CPI-C JOB TERMINATION SUPPORT
QCMWJOPT  WJ - OPTION HANDLER
QCMWKEVT  WJ - COLLECTS DATA FOR DISPLAY COMM STS
QCMWKEXT  WJ - CPI-C TERMINATION EXIT
QCMWRKJB  WJ - DISPLAY COMM STS DRIVER
QCMOIEXT  TRCCPIC INVOKATION EXIT PROGRAM
QCMOTCPC  TRCCPIC CPP
QCMOTRC   LOG TRACE RECORDS TO CPI-C TRACE FILE
QCNPCSUP  PC SUPPORT SERVER FOR DDM
QCNSCMDI  QCNSCMDI -- SBMRMTCMD INVOCATION EXIT
QCNSEVTH  QCNSEVTH -- SOURCE RECLAIM EVENT HANDLER
QCNSEXIT  QCNSEXIT -- SOURCE INVOCATION EXIT
QCNSINIT  QCNSINIT -- CN SOURCE INITIALIZATION
QCNSMCTL  QCNSMCTL -- CN SOURCE MACRO CONTROLLER
QCNSRCV   QCNSRCV -- CN SOURCE RECEIVE DDM DATA
QCNSRDDM  QCNSRDDM -- SOURCE SIDE RCLDDMCNV CPP
QCNSSCPP  QCNSSCPP -- CN SOURCE SBMRMTCMD CPP
QCNSSEND  QCNSSEND -- CN SOURCE SEND DDM DATA
QCNSTERM  QCNSTERM -- CN SOURCE SIDE TERMINATION
QCNTEDDM  QCNTEDDM -- CN TARGET EVOKED PROGRAM
QCNTEXCR  QCNTEXCR --TARGET EXCSAT REQUEST HANDLER
QCNTEXIT  QCNTEXIT -- TARGET INVOCATION EXIT
QCNTINIT  QCNTINIT -- CN TARGET INITIALIZATION
QCNTMCTL  QCNTMCTL -- CN TARGET MACRO CONTROLLER
QCNTRCV   QCNTRCV -- CN TARGET RECEIVE DDM DATA
QCNTSBMR  QCNTSBMR--TARGET SBMRMTCMD REQUEST HNDLR
QCNTSEND  QCNTSEND -- CN TARGET SEND DDM DATA
QCNTSRVC  CN TARGET SIDE SERVICE MODULE
QCNTXBUF  QCNTXBUF -- TARGET EXTEND OUTPUT BUFFER
QCNXBCMD  QCNXBCMD--BUILD COMMAND DSS PARSING TBL
QCNXBLD   QCNXBLD -- CN BUILD PARSER ASSOC SPACE
QCNXBOBJ  QCNXBOBJ--BUILD OBJECT DSS PARSING TABLE
QCNXBREP  QCNXBREP--BUILD REPLY DSS PARSING TABLE
QCNXDUMP  QCNXDUMP -- DUMP CN CONTROL BLOCKS
QCNXPRSE  QCNXPRSE -- CN DDM DATASTREAM PARSER
QCNXSTGM  QCNXSTGM -- CN STORAGE MANAGER
QCOVLFLD  DISPLAY CO/WS FM FIELD VALIDATION FUN
QCPCLNUP  COPY FILE CLEANUP PROGRAM
QCPCREAT  COPY FILE CREATE FILE/ADD MEMBERS
QCPEXCON  COPY FILE I/O EXECUTION DRIVER
QCPEXOFL  COPY FILE COMMAND PROCESSING PROGRAM
QCPFLD    COPY FILE FIELD-LEVEL PROCESSOR
QCPFRMBR  COPY FROM/TO FILE MBR/LABEL PROCESSOR
QCPGENIO  COPY FILE GENERAL I/O MODULE
QCPGRANT  COPY FILE GRANT CREATED FILE AUTHORITY
QCPPRINT  COPY FILE PRINT LISTING MODULE
QCSERVER  CENTRAL SERVER PROGRAM
QCSVLICM  CENTRAL SERVER LICENSE MANAGEMENT MODULE
QCSVNLSS  CENTRAL SERVER NLS SUPPORT MODULE
QCSVSYSM  CENTRAL SERVER SYSTEM MANAGEMENT MODULE
QCUCHGSI  CHANGE SIDE INFORMATION CPIC
QCUCRTSI  CREATE SIDE INFORMATION
QCUCSIPO  SIDE INFORMATION PROMPT OVERRIDE PGM
QCUDSPSI  DISPLAY SIDE INFORMATION
QC2IO     ILE C I-FACE TO DB OR WS DATA MANAGEMENT
QDBADDCT  DB CPP ADDPFCST CMD - ADD PF CONSTRAINT
QDBADDPK  DB ADDPRIKY FUNCTION - ADD PRIMARY KEY
QDBALTFI  ALTER TABLE
QDBAPMGR  DB MANAGE THE DBAPII
QDBAPPAN  DISPLAY ACCESS PATHS
QDBARCFR  DB ADD OR REMOVE CONSTRAINT RECOVERY
QDBAUERR  SIGNAL I/O AUTHORITY ERROR
QDBAUTFR  DB AUTHORITY RECOVERY
QDBCDFIR  DB CREATE FILE RECOVERY
QDBCDMER  DB CREATE MEMBER RECOVERY
QDBCDREC  DB FAST CREATE DELETE RECOVERY
QDBCDRED  DB FAST CREATE DELETE RECOVERY
QDBCFPOP  CHANGE FILE ATTR PROMPT OPTIONS
QDBCHEOD  DATA BASE CHANGE END OF DATA
QDBCHGCT  DB CPP CHGPFCST CMD-CHANGE PF CONSTRAINT
QDBCHGFI  CHANGE DB FILE ATTRIBUTES
QDBCHGFR  CHANGE DB FILE ATTRIBUTE RECOVERY
QDBCHGME  CHANGE DB MEMBER ATTRIBUTES
QDBCHGPL  DATABASE CHANGE PRIMARY LANGUAGE RECOVER
QDBCHKFI  DB CHECK FILE
QDBCHKLA  CHECK LOGICAL FILE AUTHORITIES
QDBCHKLK  CHECK RECORD LOCKS FOR JOB
QDBCLOSC  CPP FOR DB CLOSE COMMAND
QDBCLOSE  DATA BASE CLOSE
QDBCLRPF  CLEAR PHYSICAL FILE MEMBER
QDBCMPOP  PROMPT OVERRIDE PROGRAM FO FILE MEMBER
QDBCMPTH  DB COMPRESSION THRESHHOLD EVENT HNDLER
QDBCNVFI  DB FILE CONVERSION
QDBCNVFT  CONVERT DATABASE FILE FORMATS
QDBCNVXR  CONVERT DATABASE X-REF FILES
QDBCPMGR  VERIFY CP CONSTRAINTS
QDBCPPAN  CHECK PENDING PANELS
QDBCRTFI  CREATE DATA BASE FILE
QDBCRTFS  CREATE DATA BASE SELECT/OMIT PGM
QDBCRTME  CREATE DATA BASE MEMBER
QDBDICTR  DATA BASE DICTIONARY RECOVERY
QDBDIRUP  DATA BASE UPDATE DIRECTORY
QDBDLTFI  DELETE DB FILE
QDBDLTFS  DELETE DB FILES
QDBDLTME  DELETE DB MEMBER
QDBDMGMB  DB FILE MEMBER DAMAGE NOTIFICATION PGM
QDBDMPFI  DUMP DB FILE
QDBDSPCP  DISPLAY CHECK PENDING CONSTRAINT
QDBDUPFI  CREATE DUPLICATE FILE
QDBEVCP   EVENT MONITOR
QDBEXDFI  DB EXTRACT FILE
QDBEXDME  DB EXTRACT MEMBER INFORMATION
QDBEXEXT  EXIT PROGRAM FOR QDBEXS
QDBEXTWU  DB EXTRACT WHERE USED INFO
QDBFEOD   DATA BASE FORCE END OF DATA
QDBFFCPY  DATA BASE FAST COPY
QDBFFEXT  INVOCATION EXIT PROGRAM FOR QDBFFCPY
QDBFIXIQ  FIX THE DBAPII OR SERVER QUEUE
QDBFIXIT  DB DATA BASE RECOVERY MODULES
QDBFSTCD  DB FAST CREATE/DELETE S/36
QDBGETDR  DATA BASE GET DIRECT
QDBGETKY  DATA BASE GET BY KEY
QDBGETM   DATA BASE MULTIPLE GET
QDBGETSQ  DATA BASE GET SEQUENTIAL
QDBGRTFI  DB GRANT FILE AUTHORITY
QDBGRXFR  GRANT REVOKE XFER COMMIT RECOVERY
QDBIEXIT  INVOCATION EXIT PROGRAM
QDBINZPF  INITIALIZE PHYSICAL FILE MEMBER
QDBISHRX  PROCESS IMPLICITLY SHARED ACCESS PATHS
QDBIVLIX  REBUILD DSI EVENT HANDLER
QDBJOBLK  DB DISPLAY JOB LOCKS
QDBJOBRL  DB DISPLAY JOB RECORD LOCKS
QDBLDBR   COBOL INCLUDE FOR API QDBLDBR
QDBLDBR   LIST DB RELATIONS
QDBLDBR   QDBLDBR HEADER IN ILE/RPG
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QDBLDBR QDBLDBR HEADER IN ILE/COBOL
QDBLDBR RPG INCLUDE FOR API QDBLDBR
QDBLNGMV MOVE CHARACTER STRINGS OF MORE THAN 32K
QDBLVLID DATA ABSE GENERATE LEVEL IDENTIFIER
QDBMAINT DB REBUILD INDEXES
QDBMEEH DATABASE IPL THRESHOLD EVENT HANDLER
QDBMOVFI DB MOVE FILE
QDBMVRFR DB MOVE/RENAME FILE RECOVERY
QDBNQEH ENQUEUE EVENT HANDLER
QDBOBJLK DB OBJECT LOCK
QDBOPEN DATA BASE OPEN
QDBOPENC CPP FOR OPNDBF COMMAND
QDBORDFS DB ORDER FILES
QDBPOS SET DATA BASE FILE POSITION
QDBPOSIX DATA BASE EXTRACT FOR POSIX
QDBPRCRL PROCESS DB RECOVERY OBJECT LIST
QDBPUT DATA BASE PUT
QDBPUTD DB PUT DELETED RECORDS
QDBPUTDR DATA BASE PUT DIRECT
QDBPUTM DATA BASE PUT MULTIPLE
QDBPUTMX DATA BASE MULTIPLE PUT
QDBRCDLK DISPLAY RECORD LOCKS
QDBRCDYN DATA BASE SYNCHRONOUS RECOVERY
QDBRCIPO OVERRIDE ACCESS PATH PANEL PGM
QDBRCIPS DATA BASE IPL RECOVERY PHASE 1
QDBRCLMA DATA BASE RECLAIM PHASE 1
QDBRCLMB DATA BASE RECLAIM PHASE 2
QDBRCLMC DATA BASE RECLAIM PHASE 3
QDBRCLXR RECLAIM DATABASE SYSTEM FILES CPP
QDBRGZPF REORGANIZE PHYSICAL FILE MEMBER
QDBRMVCT DB CPP RMVPFCST CMD-REMOVE PF CONSTRAINT
QDBRMVPK DB RMVPRIKY FUNCTION: REMOVE PRIMARY KEY
QDBRNMFI DB RENAME FILE
QDBRNMLA DB RENAME LIBRARY PART A
QDBRNMLB DB RENAME LIBRARY PART B
QDBRNMME DB RENAME MEMBER
QDBRSPRE RESTORE DB FILE PRE-LOAD MODULE
QDBRSPST RESTORE DB FILE POST-IO MODULE
QDBRSRCV QDBRSRCV - RESTORE RECOVERY
QDBRTVFD COBOL INCLUDE FOR API QDBRTVFD
QDBRTVFD DB RETRIEVE FILE DESCRIPTION
QDBRTVFD QDBRTVFD HEADER IN ILE/RPG
QDBRTVFD QDBRTVFD HEADER IN ILE/COBOL
QDBRTVFD RPG INCLUDE FOR API QDBRTVFD
QDBRVKFI DB REVOKE FILE AUTHORITY
QDBSECOF PROGRAM RUNNING QSECOFR
QDBSEQMP DATA BASE SEQUENTIAL MEMBER PROCESSING
QDBSERVE DB JOB SERVER
QDBSGXID DB - FIND IDDU FIELD NAME FOR QDBSIGEX
QDBSIGEX DATA BASE SIGNAL EXCPTION
QDBSIZFI DB SIZE OF FILE
QDBSOPEN DATA BASE SHARED OPEN
QDBSVPRE DATA BASE SAVE FILE PRE-DUMP
QDBSVPST DATA BASE SAVE FILE POST-DUMP
QDBSVRCV QDBSVRCV - SAVE RECOVERY
QDBTREXT INVOCATION EXIT PROGRAM FOR DB I/O
QDBTRIGG ADD/REMOVE PF TRIGGERS
QDBTRISV DB TRIGGER/RI SERVICE ROUTINE
QDBUDR DATA BASE UPDATE/DELETE/RELEASE
QDBVFYCP VERIFY CP CONSTRAINTS
QDBVFYCT DB - RI VERIFY CONSTRAINT
QDBWHOCO WHO CALLED OPEN? (USER OR SYSTEM)
QDBWRKCT WORK PHYSICAL FILE CONSTRAINTS
QDBXCLOS CROSS REFERENCE CLOSE
QDBXFIXQ EXTERNAL EXCEPTION HANDLER FOR X-REF
QDBXFRFI DB TRANSFER FILE OWNERSHIP
QDBXREF CROSS REFERENCE
QDBXREFM CROSS REFERENCE MAIN PROGRAM
QDBXREFR DATABASE CROSS REFERENCE CLEANUP/RECOVER
QDCACCLW AUTO-CONFIGURE LOCAL CONTROLLER
QDCACCTP AUTO-CONFIGURE TAPE CONTROLLER
QDCACDDK AUTO-CONFIGURE DISKETTE
QDCACDLD AUTO-CONFIGURE LOCAL DISPLAY
QDCACDLP AUTO-CONFIGURE LOCAL PRINTER
QDCACDTP AUTO-CONFIGURE TAPE
QDCACFEH AUTO-CONFIGURE MAIN LINE
QDCADFLE ADD CONFIGURATION LIST ENTRIES
QDCADNLE ADD CNNL ENTRIES TO UIM LIST
QDCAENL EXIT PGM TO ADD CNNL ENTRIES TO UIM LIST
QDCCHCAP CHANGE APPC CONTROLLER
QDCCHCAS CHANGE ASYNC CONTROLLER
QDCCHCBS CHANGE BSC CONTROLLER
QDCCHCFN CHANGE FINANCE CONTROLLER
QDCCHCHS CHANGE HOST CONTROLLER
QDCCHCLW CHANGE LOCAL WORKSTATION CONTROLLER
QDCCHCNT CHANGE CONTROLLER DESC (NETWORK)
QDCCHCPS CHANGE VIRTUAL CONTROLLER
QDCCHCRL CHANGE RETAIL CONTROLLER
QDCCHCRW CHANGE REMOTE WORKSTATION CONTROLLER
QDCCHCTP CHANGE TAPE CONTROLLER
QDCCHDAP CHANGE APPC DEVICE
QDCCHDAS CHANGE ASYNC DEVICE
QDCCHDBS CHANGE BSC DEVICE
QDCCHDDK CHANGE DISKETTE DEVICE
QDCCHDEH CHANGE DEVICE EVENT HANDLER
QDCCHDFN CHANGE FINANCE DEVICE
QDCCHDHS CHANGE HOST DEVICE
QDCCHDIN CHANGE INTRA DEVICE
QDCCHDLD CHANGE DISPLAY DEVICE
QDCCHDLP CHANGE PRINTER DEVICE
QDCCHDNT CHANGE NET DEVICE
QDCCHDPT CHANGE SNA PASSTHROUGH DEVICE
QDCCHDRL CHANGE RETAIL DEVICE
QDCCHDSN CHANGE SNUF DEVICE
QDCCHDTP CHANGE TAPE DEVICE
QDCCHFL CHANGE CONFIGURATION LIST
QDCCHFLE CHANGE CONFIGURATION LIST ENTRIES
QDCCHIFR CHANGE NETWORK INTERFACE FOR FRAME RELAY
QDCCHIIS CHANGE ISDN NETWORK INTERFACE CPP
QDCCHLAS CHANGE ASYNC ND
QDCCHLBS CHANGE BSC ND
QDCCHLD CHANGE LINE DESCRIPTION (S/R)
QDCCHLDI CHANGE LINE DESCRIPTION DDI
QDCCHLET CREATE ETHERNET LINE DESCRIPTION
QDCCHLFR CHANGE FRAME RELAY ND
QDCCHLFX CHANGE FAX LINE DESCRIPTION
QDCCHLID CHANGE IDLC NETWORK LINE DESCRIPTION
QDCCHLNT CHANGE NET NETWORK LINE DESCRIPTION
QDCCHLSD CHANGE SDLC LINE DESCRIPTION
QDCCHLTD CHANGE TDLC LINE DESCRIPTION
QDCCHLTR CHANGE TOKEN RING NETWORK LINE DESCR
QDCCHLWL CHANGE WIRELESS LINE DESCRIPTION
QDCCHL25 CHANGE X25 NETWORK LINE DESCR
QDCCHMD CHANGE MODE DESCRIPTION
QDCCHNL CHANGE CONNECTION LIST CPP
QDCCHNTB CHGNTBD COMMAND PROCESSING PROGRAM
QDCCHNWS CHANGE NWSD COMMAND PROCESSING PROGRAM
QDCCHSD CHANGE CLASS-OF-SERVICE DESCRIPTION
QDCCHSPT CHANGE DEVICE DESCRIPTION SNA PT
QDCCKCAP CHECK APPC CONTROLLER PARMS
QDCCKCAS CHECK ASYNC CONTROLLER PARMS
QDCCKCBS CHECK BSC CONTROLLER PARMS
QDCCKCFN CHECK FINANCE CONTROLLER PARMS
QDCCKCHS CHECK HOST CONTROLLER PARMS
QDCCKCLW VALIDITY CHECKER FOR CRTCTLLWS
QDCCKCRL CHECK RETAIL CONTROLLER PARMS
QDCCKCRW CHECK REMOTE WORKSTATION CONTROLLER PARM
QDCCKCTP VALIDITY CHECKER FOR CRTCTLTAP
QDCCKDAP CREATE APPC DEVICE DESCRIPTION
QDCCKDLD VALIDITY CHECK LOCAL DISPLAY DEVICE CPP
QDCCKDLP CHECK LOCAL PRINTER CPP
QDCCKDPT CHECK SNA PASSTHROUGH DEVICE
QDCCKFL CHECK CONFIGURATION LIST
QDCCKFST WORK CONFIG STATUS VALIDITY CHECKING PGM
QDCCKIFR CREATE NETWORK INTERFACE FOR FRAME RELAY
QDCCKIIS VALIDITY CHECK CRTNWIISDN PARAMETERS
QDCCKLAS VALIDITY CHECKING MODULE FOR ASYNC
QDCCKLDI CHECK LINE DESCRIPTION DDI
QDCCKLET CHECK ETHERNET LINE DESCRIPTION
QDCCKLFR FRAME RELAY CHECK LIND

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QDCCKLFX  VALIDITY CHECKER FOR CRTLINFAX
QDCCKLID  CHECK IDLC NETWORK LINE DESCR
QDCCKLSD  VALIDITY CHECKING MODULE FOR SDLC
QDCCKLTR  CHECK TRN LINE DESCRIPTION
QDCCKLWL  CHECK WIRELESS LINE DESCRIPTION
QDCCKL25  CHECK X25 NETWORK LINE DESCR
QDCCKNLE  ADDCNNLE & CHGCNNLE VALIDITY CHECKER
QDCCKNTB  CREATE NETBIOS VALIDITY CHECKER
QDCCKNWS  CHECK NETWORK SERVER PARAMETERS
QDCCKRDB  ATOMICITY CHECK FOR SRM
QDCCKSD   CHECK CLASS-OF-SERVICE DESC
QDCCKSTG  CHECK SERVER STORAGE PARAMETERS
QDCCNFO   CONVERT CONFIGURATION OBJECTS
QDCCPCD   COPY CONTROLLER DESCRIPTION
QDCCPCD1  V1R3 COPY CONTROLLER DESC
QDCCPDD   COPY DEVICE DESCRIPTION
QDCCPDD1  COPY DEVICE DESCRIPTION
QDCCPFL   COPY CONFIGURATION LIST
QDCCPLD   COPY LINE DESCRIPTION CPP
QDCCPLD1  V1R3 COPY LINE DESC
QDCCPMD   COPY MODE DESCRIPTION
QDCCPNL   COPY CNNL
QDCCPNLE  COPY CNNL ENTRY PROGRAM
QDCCPNTB  COPY NTBD COMMAND PROCESSING PROGRAM
QDCCPNWS  COPY NWSD COMMAND PROCESSING PGM
QDCCPSD   COPY CLASS-OF-SERVICE DESCRIPTION
QDCCRCAP  CREATE APPC CONTROLLER
QDCCRCAS  CREATE ASYNC CONTROLLER
QDCCRCBS  CREATE BSC CONTROLLER
QDCCRCEH  CREATE CONTROLLER DESC EVENT HANDLER
QDCCRCFN  CREATE FINANCE CONTROLLER
QDCCRCHS  CREATE HOST CONTROLLER
QDCCRCLW  CREATE LOCAL WORKSTATION CONTROLLER DESC
QDCCRCNT  CREATE CONTROLLER DESC (NETWORK)
QDCCRCPS  CREATE PASSTHRU CONTROLLER
QDCCRCRL  CREATE RETAIL CONTROLLER
QDCCRCRW  CREATE REMOTE WORKSTATION CONTROLLER
QDCCRCTP  CREATE TAPE CONTROLLER
QDCCRDAP  CREATE APPC DEVICE DESCRIPTION
QDCCRDAS  CREATE ASYNC DEVICE DESCRIPTION CPP
QDCCRDBS  CREATE BSC DEVICE DESCRIPTION
QDCCRDDA  CREATE ASCII DISPLAY DEVICE DESCRIPTION
QDCCRDDK  CREATE DISKETTE DEVICE DESCRIPTION
QDCCRDFN  CREATE FINANCE DEVICE DESCRIPTION
QDCCRDHS  CREATE SNA HOST DEVICE DESCRIPTION
QDCCRDIN  CREATE INTRA DEVICE DESCRIPTION CPP
QDCCRDLD  CREATE DISPLAY DEVICE
QDCCRDLP  CREATE PRINTER DEVICE DESCRIPTION
QDCCRDNT  CREATE NET DEVICE DESCRIPTION CPP
QDCCRDPA  CREATE ASCII PRINTER DEVICE DESCRIPTION
QDCCRDPT  CREATE SNA PASS THROUGH DEVICE
QDCCRDRL  CREATE RETAIL DEVICE DESCRIPTION
QDCCRDSN  CREATE SNUF DEVICE DESCRIPTION
QDCCRDTP  CREATE TAPE DEVICE DESCRIPTION
QDCCRFD   F6 CREATE FROM WRKXXXX
QDCCRFL   CREATE CONFIGURATION LIST
QDCCRIFR  CREATE NETWORK INTERFACE FOR FRAME RELAY
QDCCRIIS  CREATE ISDN NETWORK INTERFACE DESC
QDCCRLAS  CREATE ASYNC LINE DESCRIPTION
QDCCRLBS  CREATE BSC ND
QDCCRLDI  CREATE LINE DESCRIPTION DDI
QDCCRLET  CREATE ETHERNET NETWORK LINE DESCR
QDCCRLFR  CREATE FRAME RELAY ND
QDCCRLFX  CREATE FAX ND
QDCCRLID  CREATE IDLC ND
QDCCRLNT  CREATE NET ND
QDCCRLSD  CREATE SDLC ND
QDCCRLTD  CREATE TDLC ND
QDCCRLTR  CREATE TOKEN RING NETWORK LINE DESCR
QDCCRLWL  CREATE WIRELESS LINE DESCR
QDCCRL25  CREATE X25 NETWORK LINE DESCR
QDCCRMD   CREATE MODE
QDCCRNL   CREATE CONNECTION LIST CPP
QDCCRNTB  CREATE NETBIOS DESCRIPTION CPP
QDCCRNWS  CREATE NETWORK SERVER DESCRIPTION CPP
QDCCRSD   CREATE CLASS-OF-SERVICE DESCRIPTION
QDCCRSPT  CREATE DEVICE DESCRIPTION SNA PT
QDCDCREC  DB FAST CREATE DELETE RECOVERY
QDCDLCD   DELETE CONTROLLER DESCRIPTION
QDCDLCEH  DELETE CONTROLLER DESC EVENT HANDLER
QDCDLDD   DELETE DEVICE DESCRIPTION
QDCDLDEH  DELETE DD ERROR HANDLER
QDCDLFL   DELETE CONFIGURATION LIST
QDCDLID   DELETE NETWORK INTERFACE DESCRIPTION
QDCDLLD   DELETE LINE DESCRIPTION
QDCDLMD   DELETE MODE DESCRIPTION
QDCDLNL   DELETE CONNECTION LIST CPP
QDCDLNTB  DLTNTBD COMMAND PROCESSING PROGRAM
QDCDLNWS  DELETE NWSD COMMAND PROCESSING PROGRAM
QDCDLSD   DELETE CLASS OF SERVICE DESCR
QDCDSCD   DISPLAY CONTROLLER DESCRIPTION
QDCDSDD   DISPLAY DEVICE DESCRIPTION
QDCDSFL   DISPLAY CONFIGURATION LIST
QDCDSID   DISPLAY NETWORK INTERFACE DESCRIPTION
QDCDSLD   DISPLAY LINE DESCRIPTION
QDCDSMD   DISPLAY MODE DESCRIPTION
QDCDSNL   DISPLAY CNNL ENTRIES
QDCDSNLE  DISPLAY SINGLE CNNL ENTRY
QDCDSNTB  DISPLAY NTBD COMMAND PROCESSING PROGRAM
QDCDSNWS  DISPLAY NWSD COMMAND PROCESSING PGM_
QDCDSSD   DISPLAY CLASS-OF-SERVICE DESC
QDCILFL   INCOMPLETE UIM LIST PROCESSING
QDCLCFGD  API TO RETURN LIST OF CONFIG DESCRIPTION
QDCLCFGD  QDCLCFGD API HEADER FOR CBL
QDCLCFGD  QDCLCFGD API HEADER IN RPG
QDCLCFGD  QDCLCFGD HEADER IN ILE/RPG
QDCLCFGD  QDCLCFGD HEADER IN ILE/COBOL
QDCLKSTG  LINK/UNLINK NWS STORAGE CPP
QDCLSFO   LIST CONFIGURATION DESCRIPTIONS
QDCLSFO1  V1R3 LIST CONFIGURATION DESC
QDCPOID   PROMPT OVERRIDE FOR CRTNWIISDN
QDCPOLP   PROMPT OVERIDE PROGRAM FOR CRTDPTL
QDCPONL   CRTCNNL PROMPT OVERRIDE PROGRAM
QDCPONLE  ADDCNNLE PROMPT OVERRIDE PROGRAM
QDCPSNL   EXIT PGM FOR POSITION TO IN CNNLS
QDCPTCA   PRINT CONFIGURATION ADDRESSES
QDCPTDLD  PORT SHARING CREATE DISPLAY
QDCPVDLD  PERMISSIBLE VALUES FOR CRTDEVDSP COMMAND
QDCPVDPA  VALUES FOR MFRTYPMDL IN CHG/CRT DEVPRT
QDCPVIIS  VALUES FOR NETTYPE IN CRTNWIISDN
QDCPVNWS  CRT/CHGNWSD CHOICES PROGRAM
QDCRCFGS  API TO RETRIEVE CONFIGURATION STATUS
QDCRCFGS  QDCRCFGS API HEADER FOR CBL
QDCRCFGS  QDCRCFGS API HEADER IN RPG
QDCRCFGS  QDCRCFGS HEADER IN ILE/RPG
QDCRCFGS  QDCRCFGS HEADER IN ILE/COBOL
QDCRCTLD  API TO RETRIEVE CONTROLLER DESCRIPTION
QDCRCTLD  QDCRCTLD API HEADER FOR CBL
QDCRCTLD  QDCRCTLD API HEADER IN RPG
QDCRCTLD  QDCRCTLD HEADER IN ILE/RPG
QDCRCTLD  QDCRCTLD HEADER IN ILE/COBOL
QDCRDEVD  API TO RETRIEVE DEVICE DESCRIPTION INFO
QDCRDEVD  QDCRDEVD API HEADER FOR CBL
QDCRDEVD  QDCRDEVD API HEADER IN RPG
QDCRDEVD  QDCRDEVD HEADER IN ILE/RPG
QDCRDEVD  QDCRDEVD HEADER IN ILE/COBOL
QDCRLIND  API TO RETRIEVE LINE DESCRIPTION INFO
QDCRLIND  QDCRLIND API HEADER FOR CBL
QDCRLIND  QDCRLIND API HEADER IN RPG
QDCRLIND  QDCRLIND HEADER IN ILE/RPG
QDCRLIND  QDCRLIND HEADER IN ILE/COBOL
QDCRMNLE  REMOVE ENTRY FROM CNNL
QDCRNFD   RENAME OBJECTS
QDCRNFRC  RENAME RECOVERY
QDCRNNLE  RENAME ENTRY IN CNNL
QDCRNWSD  RETRIEVE NETWORK SERVER DESCRIPTION API
QDCRSCD   RESTORE CONTROLLER DESCRIPTION
QDCRSCIG  RESET IGC CONTROLLER RAM
QDCRSDD   CREATE INSTALL DEVICE DESCRIPTIONS
QDCRSFL   RESTORE CONFIG LIST
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QDCRSID RESTORE NETWORK INTERFACE CPP
QDCRSLD RESTORE LINE DESCRIPTION CPP
QDCRSMD RESTORE MODD MODULE
QDCRSNL RESTORE CONNECTION LIST MODULE
QDCRSSD RESTORE COSD DESCRIPTION
QDCRTADS RETRIEVE ADDNWSSTGL COMMAND SOURCE
QDCRTCD RETRIEVE CONTROLLER DESCRIPTION
QDCRTDD RETRIEVE DEVICE DESCRIPTION
QDCRTFL RETRIEVE CONFIG LIST
QDCRTFR CHANGE NETWORK INTERFACE FOR FRAME RELAY
QDCRTFSR RETRIEVE CONFIGURATION SOURCE
QDCRTFST RETRIEVE CONFIGURATION STATUS
QDCRTID RETRIEVE NWI DESCRIPTION
QDCRTLD RETRIEVE LINE DESCRIPTION
QDCRTMD COPY MODE DESCRIPTION
QDCRTNTB RETRIEVE NETBIOS DESCRIPTION
QDCRTNWS RETRIEVE NWSD COMMAND PROCESSING PGM
QDCRTSD RETRIEVE CLASS-OF-SERVICE DESC
QDCRVFLE REMOVE CONFIGURATION LIST ENTRIES
QDCSTF START CONFIGURATION
QDCSTUBA STUB MODULE A FOR DC FIXES
QDCSTUBB STUB MODULE B FOR DC FIXES
QDCSTUBC STUB MODULE C FOR DC FIXES
QDCSTUBD STUB MODULE C FOR DC FIXES
QDCSTUBE STUB MODULE E FOR DC FIXES
QDCTRF TERMINATE CONFIGURATION
QDCVCCAP CHECK CHANGE APPC CONTROLLER
QDCVCCAS CHECK CHANGE ASYNC CONTROLLER
QDCVCCBS CHECK CHANGE BSC CONTROLLER
QDCVCCFN CHECK CHANGE FINANCE CONTROLLER
QDCVCCHS CHECK CHANGE HOST CONTROLLER
QDCVCCRL CHECK CHANGE RETAIL CONTROLLER
QDCVCCRW CHECK CHANGE REMOTE WS CONTROLLER
QDCVCDAP VALIDITY CHECK CHANGE APPC DEVICE
QDCVCDLD VALIDITY CHECK CHANGE DISPLAY DEVICE
QDCVCDLP VALIDITY CHECK CHANGE PRINTER DEVICE
QDCVCIFR CHNAGE NETWORK INTERFACE FOR FRAME RELAY
QDCVCIIS VALIDITY CHECK CHGNWIISDN PARAMETERS
QDCVCLAS VALIDITY CHECKING MODULE FOR CHANGE ASC
QDCVCLDI CHECK DDI LINE DESCRIPTION FOR CHANGE
QDCVCLET VALIDITY CHECK ETHERNET LINE DESC
QDCVCLFR VALIDITY CHECK FRAME RELAY LINE DESCR
QDCVCLID CHECK IDLC NETWORK LINE DESCR
QDCVCLTR CHECK TRN LINE DESCRIPTION FOR CHANGE
QDCVCLWL VALIDITY CHECKER FOR CHGLINWLS CMD
QDCVCL25 CHECK X25 NETWORK LINE DESCR
QDCVCNL CREATE/CHANGE CNNL VALIDITY CHECKER
QDCVCNTB CHANGE NTBD VALIDITY CHECKER
QDCVCNWS CHANGE NWSD VALIDITY CHECKING PROGRAM
QDCVCSD CHECK CLASS-OF-SERVICE DESC ON CHANGE
QDCVRC VARY CNTR DESCRIPTION ON OR OFF
QDCVRD VARY DEVICE DESCRIPTION ON OR OFF
QDCVRDEH VARY DEVICE EVENT HANDLER
QDCVRL VARY LINE DESCRIPTION ON OR OFF
QDCVRN VARY NETWORK INTERFACE ON OR OFF
QDCVRNWS VRYCFG *NWS COMMAND PROCESSING PGM
QDCVRX VARY CONFIGURATION OBJECT ON OR OFF
QDCWENLF WORK WITH CNNL ENTRY FUNCTIONS
QDCWKCFG WORK WITH CONFIGURATIONS FUNCTIONS
QDCWKFO WORK WITH CONFIGURATION DESCRIPTIONS
QDCWKFOF WORK WITH CONFIGURATION OBJECT FUNCTIONS
QDCWKFSF QDCWKFSF - PROCESS OPTS FOR QDCWKFST
QDCWKFST QDCWKFST - CPP FOR WRKCFGSTS
QDCWKNLE WORK WITH CONNECTION LIST ENTRIES
QDCWKNTB WORK WITH NTBDS COMMAND PROCESSING PGM
QDCWKNWS WORK WITH NWSDS COMMAND PROCESSING PGM
QDCXLATE TRANSLATE FUNCTION
QDDADDDV ADD MIXED DEVICE ENTRY CPP
QDDCCMF CREATE DEVICE FILE CPP (CMN/BSC)
QDDCDF CREATE DEVICE FILE CPP-DSP/PRT/CRD/DKT
QDDCDFDV DEVICE FILE IMS PROCESSOR
QDDCDPF CPP FOR CRTDSPF AND CRTPRTF
QDDCHOIC PARAMETER VALUE CHOICES PROGRAM FOR TAPF
QDDCKDB DATA BASE FILE SYNTAX CHECKER
QDDCKDV DEVICE FILE SYNTAX CHECKER
QDDCLF CREATE LOGICAL FILE CPP
QDDCLFM CREATE LOGICAL FILE MEMBER CPP
QDDCPF CREATE PHYSICAL FILE CPP
QDDCPFM CREATE PHYSICAL FILE MEMBER CPP
QDDDMBR DELETE MEMBER CPP
QDDDVEPX PROMPTER EXIT FOR CHGICFDEVE COMMAND
QDDESPEH EXTEND SPACE EXCEPTION HANDLER
QDDFLSPX PROMPTER EXIT FOR CHANGE DEVICE FILES
QDDINIT INITIALIZE KWD TABLES
QDDLFFLD LOGICAL FILE FIELD PROCESSOR
QDDMCMF MODIFY DEVICE FILE CPP (CMN/BSC)
QDDMDF MODIFY DEVICE FILE CPP-DSP/PRT/CRD/DKT
QDDPFFLD PHYSICAL FILE FIELD PROCESSOR
QDDPRINT DDS COMMON PRINT MODULE
QDDREAD DDS COMMON READ MODULE
QDDREFER DDS REFERENCE PROCESSOR
QDDRMVDV MIXED FILE REMOVE DEVICE CPP
QDDSEU SEU INTERFACE MODULE TO DDS CHECKERS
QDDSIDP DDS QDDCDF/QDDREAD EMULATOR
QDDSPRDB DATA BASE FILE SYNTAX PROCESSOR
QDDSPRDV DEVICE FILE SYNTAX PROCESSOR
QDDVTAPF VALIDITY CHECKING PROGRAM FOR TAPF PARMS
QDFANZR ANALYZE DEVICE FILE FOR RESTORE
QDFBLDDF BUILDS DEVICE FILE CONTROL MODULE
QDFCDF CREATE DEVICE FILE MAINLINE
QDFCDFPR FIELD LEVEL DEVICE FILE PROCESSOR
QDFCHKFL CHECK DEVICE FILE STATUS
QDFCNVPP MANAGE FILE CREATION/CONVERSION LEVELS
QDFCRTWU CREATE WU SECTION
QDFDDF DELETE DEVICE FILE
QDFDFTPR BUILD NON-FIELD LEVEL FM/WU
QDFDMGNT SAVE FILE DAMAGE NOTIFCATION PGM
QDFDMPDF DMPSYSOBJ OBJECT HANDLER
QDFDUPDF DUPLICATE SAVE FILE
QDFEDF DEVICE FILE EXTRACT
QDFGRANT GRANT AUTHORITY TO DEVICE FILE
QDFINIT INITIALIZE CATAGORY ID TABLES
QDFKWDPR DF KEYWORD PROCESSOR
QDFLVLGN GENERATE LEVEL CHECK IDS
QDFMDF MODIFY DEVICE FILE
QDFMODDF MODIFY DF SPACE
QDFMOVE MOVE DEVICE FILE
QDFRCDPR DF FM SOURCE PROCESSOR
QDFRENAM RENAME DEVICE FILE
QDFREVOK REVOKE AUTHORITY TO DEVICE FILE
QDFRSTDF RESTORE DEVICE FILE
QDFRTVFD RETRIEVE DISPLAY FILE API
QDFSAVDF SAVE DEVICE FILES
QDFSAVPV DF OBJECT HANDLER FOR SAVES TO PREV REL
QDFSIZE EXTRACT SIZE OF DEVICE FILE
QDFVDLST VALIDATE DEVICE LIST
QDFXOWNR TRANSFER OWNER FOR DEVICE FILE
QDKCHECK QDKCHECK
QDKCHEXT QDKCHEXT
QDKCLOSE DISKETTE CLOSE ROUTINE
QDKDSPY DISKETTE DISPLAY CPR
QDKDUP QDKDUP
QDKEOV DISKETTE END OF VOLUME PROCESSING
QDKERROR DISKETTE EXCEPTIONS AND MESSAGES
QDKFEOD DISKETTE FORCE END OF DATA ROUTINE
QDKGET DISKETTE GET ROUTINE
QDKGETI QDKGETI
QDKINZFY INITIALIZE ON THE FLY
QDKLUDIN DISKTTE - LUD ASSOCIATED SPACE INIT
QDKOPEN QDKOPEN
QDKPUT DISKETTE PUT ROUTINE
QDKPUTI QDKPUTI
QDKUTIL DISTETTE UTILITIES CPP
QDMACCIN ACCEPT INPUT - NATIVE
QDMACCIX ACCEPT INPUT INVOCATION EXIT MODULE
QDMACKEH ACCEPT INPUT ACKNOWLEDGMENT EVENT HANDLR
QDMACQDP ACQUIRE DISPLAY DEVICE - SIGN ON
QDMACQDV ACQUIRE DEVICE - DISPLAY AND ICF
QDMAINIT INITIALIZE QDMACQDV ASSOCIATED SPACE
QDMBKOUT COMMON BACKOUT - UNMONITORED ESCAPE MSGS

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QDMCDMQE  CLOSE DMCQ ENTRY - DB ONLY, UFCB DESTRYD
QDMCHOIC  DM OVERRIDE COMMAND CHOICES PROGRAM
QDMCLOSE  COMMON FILE CLOSE
QDMCOPEN  COMMON FILE OPEN
QDMCRODP  CREATE PROTOTYPE OPEN DATA PATH
QDMDELOV  DELETE OVERRIDE CPP
QDMDLTDV  DELETE PROGRAM DEVICE OVERRIDES CPP
QDMDMGNT  DATA MGT FILE DAMAGE NOTIFICATION PGM
QDMDSPIX  INVOCATION EXIT PGM - QDMDSPOV, QDMDSPOF
QDMDSPOF  DISPLAY OPEN FILES
QDMDSPOV  DISPLAY FILE OVERRIDES CPP
QDMDTAEV  ESTABLISH DATA AVAILABLE EVENT
QDMEHDES  HANDLE OBJ DSTRYD/PTR NOT SET - QDMCOPEN
QDMERRHP  COMMON DM ERROR HANDLING
QDMFCLSE  FILETYPE CLOSE MODULE
QDMGETDV  GET PROGRAM DEVICE OVERRIDES
QDMGETOV  GET FILE OVERRIDES - QDMCOPEN
QDMGETST  GET STATUS - DISPLAY AND ICF DEVICES
QDMIFERR  SIGNAL INTERFACE ERROR EXCEPTIONS
QDMLCKIX  INVOCATION EXIT PROGRAM FOR QDMLOCK
QDMLOCK   DM LOCK PROGRAM - CALLED BY LOCK MACRO
QDMMINIT  INITIALIZE QDMCOPEN ASSOCIATED SPACE
QDMNODEV  DM SIGNAL PROGRAM DEVICE NOT FOUND
QDMOVERD  OVERRIDE FILE COMMANDS CPP - ALL BUT PRT
QDMOVRDV  OVERRIDE PROGRAM DEVICE ENTRY CPP
QDMOVRPR  OVERRIDE PRINT FILE COMMAND CPP
QDMPASS   DM PASS DEVICE
QDMRCLSE  RECLAIM CLOSE
QDMRLSDV  RELEASE DEVICE - DISPLAY AND ICF
QDMROUTE  DM ROUTE FILE OPERATIONS
QDMRTVFO  COBOL INCLUDE FOR API QDMRTVFO
QDMRTVFO  EXTRACT FILE OVERRIDE INFORMATION API
QDMRTVFO  RPG INCLUDE FOR API QDMRTVFO
QDMRTVFO  RPGLE INCLUDE FOR API QDMRTVFO
QDMSIGNL  DM SEND EXCAPE MESSAGES FOR QDMCOPEN
QDMTCLSE  TERMINATION CLOSE
QDMUNLCK  DM UNLOCK - CALLED BY UNLOCK MACRO
QDMVOVRD  OVRTAPF COMMAND - VALIDITY CHECKER PGM
QDRDSPAL  DISKETTE REPAIR UTILITY DISPLAY/ALTER
QDRMAIN   DISKETTE REPAIR UTILITY MAINLINE
QDRPRINT  DISKETTE REPAIR UTILITY PRINT
QDRREAD   DISKETTE REPAIR UTILITY READ
QDRWRITE  DISKETTE REPAIR UTILITY WRITE
QDUMMY    MODULE TO VALIDATE CCSIDS
QDVCLRPL  CLEAR POOL CPP
QDVSOACC  SET OBJECT ACCESS CPP
QDXDDOER  DSNX DOER EXECUTION MAINLINE
QDXDDRA   DSNX DOER DELETE/REPLACE/ADD
QDXDEVNT  DSNX DOER INITIALIZATION
QDXDINIT  DSNX DOER INITIALIZATION
QDXDJOB   DSNX DOER BATCH JOB SUBMISSION CONTROL
QDXDMSG   DSNX DOER SEND MESSAGE MODULE
QDXDRTV   DSNX DOER RETRIEVE OBJECT
QDXHINIT  DSNX HOST INTERFACE INITIALIZATION
QDXHRCV   DX HOST INTERFACE RECEIVE DSX REQUEST
QDXHRTR   DSNX HOST INTERFACE ROUTER MODULE
QDXHSEND  DX HOST INTERFACE SEND DSX RESPONSE
QDXHTERM  DSNX HOST INTERFACE TERMINATION MODULE
QDXORCV   DSNX OBJECT DISTRIBUTION RECEIVE
QDXORCVX  DSNX OBJECT DISTRIBUTION RECEIVE IEXIT
QDXPDSPQ  DSNX PITCHER USER INTERFACE -WRKDPCQ
QDXPRCV   DSNX PITCHER TO PC RECEIVER
QDXPSEND  DSNX PITCHER TO PC SENDER FUNCTION
QDXPSNIX  PITCHER TO PC SENDER INVOCATION EXIT PGM
QDXRLSPH  DSNX CPP FOR RLSNDMPHS COMMAND
QDXXSTGM  DSNX DX STORAGE MANAGER
QDOENDTS  END DATA STREAM TRANSLATE SESSION
QDOSTRTS  START DATA STREAM TRANSLATE SESSION
QDOTRNDS  TRANSLATE DATA STREAM
QEAADMIN  CALL ADMIN MAIN DRIVER QEADRVR
QEACEXIT  TRNEDU COMMAND EXIT PROGRAM
QEADELET  COMMON DELETE ROUTINE
QEADRVR   ADMIN MAIN DRIVER
QEADRVR1  BREAK OUT STANDALONE ROUTINES
QEADSPD   SDE HANDLE DISPLAY DESCRIPTION
QEAIEXIT  ADMIN I_EXIT FOR QEADRVR
QEAMERGE  MERGE AUDIENCE PATH INFORMATION
QEAPRNT   SDE HANDLE PRINT LIST
QEARBKM   REMOVE STUDENT BOOKMARKS
QEARMVBM  REMOVE BOOKMARK - CUSTOMER INTERFACE
QEARST2   QSDE MRM/MRI PDA EXIT PGM
QEASWPST  PROGRAM TO DISALLOW ENDREQ
QEATPBTM  COMMON TOP/BOTTOM ROUTINE
QEATRAN   SDE HANDLE CONVERSION
QEAWAUD   SDE HANDLE WORKING WITH AUDIENCE PATHS
QEAWCRS   SDE HANDLE WORKING WITH COURSES
QEAWENR   SDE HANDLE STUDENT ENROLLMENT
QEAWMOD   SDE HANDLE MODULE PROCEDURES
QEAWSTU   ADMIN STUDENT VIEW MODULES
QECCRECD  CREATE EDIT CODE DESCRIPTION
QECCVTEC  CONVERT EDIT MASK API FOR EDIT CODE
QECCVTEW  CRTEAT EDIT MASK FROM EDIT WORD
QECDSECD  DISPLAY EDIT DESCRIPTION
QECEDITS  EXPAND STANDARD EDIT CODE
QECEDITU  USER EDIT CODE EXPANSION
QECEDITW  EDIT WORD EXPANSION
QECEDT    EDIT MI API
QEDADDR   ADD A RECORD TO THE REMOTE SYSTEM DATA
QEDCHGR   CHANGE A REMOTE SYSTEM DATA RECORD
QEDCLNUP  CLOSE AND CLEAN UP ANY OPEN FILES
QEDCRTR   CREATE CONTACT DATABASE RECORD
QEDDLTR   DELETE A RECORD FROM THE CONTACT DATABAS
QEDGETR   QUERY THE CONTACT DATABASE FILE
QEDIEXT   WRK/SLC SERVICE PROVIDER INVOCATION EXIT
QEDLANGL  CDB MODULE TO CREATE ALPHA LANGUAGE LIST
QEDLIST   CDB SERVICES LIST SCREEN MODULE
QEDLSACT  LIST ACTION HANDLER
QEDLSTQA  CDB Q&A LIST SCREEN
QEDMODES  CDB SSF MODIFY MODULE
QEDMODIA  CDB TIA MODIFY MODULE
QEDMODMA  CDB UOP MODIFY MODULE
QEDMODQA  CDB Q&A MODIFY MODULE
QEDMODTI  CDB TIE MODIFY MODULE
QEDOPEN   OPEN THE CONTACT DATABASE FILE
QEDRMVR   DELETE A RECORD FROM THE REMOTE SYS DATA
QEDRTVL   ADD LIST ENTRIES TO ED UIM LIST
QEDRTVR   RETREIVE A RECORD FROM REMOTE SYS DATA
QEDSCLL   SELECT COVER LETTER LANGUAGE
QEDSCTL   SCREEN CONTROLLER CPP
QEDSSP    SELECT SERVICE PROVIDER MODULE
QEDUPDR   UPDATE THE CONTACT DATABASE FILE
QEGAECON  CONVERSION TOOL FOR SDE
QEGANAL   CONVERSION TOOL FOR SDE
QEGCTRL   OPTION WINDOW AND PART OF SEDF TAGS
QEGDISP   CREATE 5250 DATA STREAM FOR SEDF
QEGENC    UNPACK RECORDS
QEGFILE   FILE HANDLING
QEGINPUT  INPUT HANDLING
QEGLIST   HANDLE CUA LIST GLOSSARY AND INFO WINDOW
QEGMAIN   MAIN PROGRAM OF SEDF
QEGNUM    COMPUTE NUMERIC EXPRESSION
QEGQUES   QUESTION HANDLER
QEGRSTRT  READ/WRITE RESTART FILE
QEGSTRUC  POP/PUSH DATA FOR CONTROL STRUCTURES
QEGUTIL   UTILLITIES FOR SEDF AND DBCS SUPPORT
QEGVAR    VARIABLE HANDLER FOR SEDF
QEGWIND   HANDLE WINDOW TAGS
QEMATTN   QEMATTN - 3270 DISPLAY EMULATION
QEMBSCEH  QEMBSCEH - 3270 DISPLAY EMULATION
QEMCFGEX  I-EXIT FOR CONFIGURATION UPDATES
QEMCFGIN  PTF FILE PROGRAM FOR CONFIGURATION
QEMCFGOV  RETRIEVE CONFIGURATION DESCRIPTION
QEMCFGSN  ADD/CHANGE/DELETE CONFIGURATION
QEMIEXIT  QEMIEXIT - 3270 DISPLAY EMULATION
QEMIOERR  QEMIOERR - 3270 EMULATION
QEMPCNTL  QEMPCNTL - 3270 PRINTER EMULATION
QEMPEBSC  QEMPEBSC - BSC 3270 PRINTER EMULATION
QEMPESCS  QEMPESCS - SNA 3270 PRINTER EMULATION
QEMPESEH  QENPESEH - SNA 3270 PRINTER EMULATION
QEMPESNA  QEMPESNA - SNA 3270 PRINTER EMULATION
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QEMPESTR	QEMPESTR - 3270 PRINTER EMULATION
QEMPEXIT	QEMPEXIT - 3270 PRINTER EMULATION
QEMPRINT	QEMPRINT - 3270 PRINTER EMULATION
QEMRST	QEMRST - 3270 DISPLAY EMULATION
QEMSNAEH	QEMSNAEH - 3270 DISPLAY EMULATION
QEMSPEND	QEMSPEND - 3270 DISPLAY EMULATION
QEMSWSEH	QEMSWSEH - SNA 3270 DISPLAY EMULATION
QEMSYSRQ	QEMSYSRQ - SNA 3270 DISPLAY EMULATION
QEMTSTRQ	QEMTSTRQ - BSC 3270 DISPLAY EMULATION
QEMWFCEH	QEMWFCEH - 3270 DISPLAY EMULATION
QEMWSEH	QEMWSEH - BSC 3270 DISPLAY EMULATION
QEM3270	QEM3270 - 3270 DISPLAY EMULATION
QESANOTE	PROCESS AUTO NOTIFY
QESASRQS	AS/400 SERVICE REQUEST PROCESSING
QESASTST	COMMAND PROCESSING MODULE
QESAUTNF	SIGNAL AUTO NOTIFICATION
QESBLDSA	CREATE/CONVERT SYSTEM VALUE OBJECT
QESCARP	CALL RECORD PROCESSOR
QESCHGSA	CHANGE SERVICE ATTRIBUTES
QESCIEXT	COMM IEXIT PROGRAM FOR QESCARP
QESCSAPO	PROMPT OVERRIDE FOR CHG SRV ATTRIBUTES
QESCSRVA	GET/CREATE SERVICE ATTRIBUTE OBJECT
QESDSPSA	DISPLAY SERVICE ATTRIBUTES CPP
QESFXRCV	RECEIVES PTFS FROM ODF
QESFXSTR	STARTS A BATCH PROCESS IN QSNADS SUBSYS
QESIEXT	SSF IEXIT PROGRAM
QESMGR	ECS COMMUNICATIONS TARGET
QESPRCAU	PROCESS AUTO NOTIFY
QESPSR	PREPARE SERVICE REQUEST
QESPTF	CALL RECORD PROCESSOR
QESQRYPS	AS/400 SERVICE REQUEST PROCESSING
QESQRYSU	COMMAND PROCESSING MODULE
QESRCVAN	RECEIVE PROBLEM ANSWER
QESROUT	SSF ROUTER MODULE
QESRPT	PREPARE SERVICE REQUEST AND REPORT PROB
QESRSPTF	REQUEST PTF PROGRAM
QESRSRVA	API TO RETREIVE SERVICE ATTRIBUTES
QESRSRVA	QESRSRVA API HEADER FOR CBL
QESRSRVA	QESRSRVA API HEADER IN RPG
QESRSRVA	QESRSRVA HEADER IN ILE/RPG
QESRSRVA	QESRSRVA HEADER IN ILE/COBOL
QESSAVMA	UPDATE SYSTEM VALUE OBJECT
QESSETUP	SET UP COMMON DATA AREA
QESSRVRQ	COMMAND PROCESSING MODULE
QESUPD	SSF UPDATE OVERRIDE DATA MODULE
QEXCAFI	CACHE FILE INDEX MODULE
QEXCCCG	S/36 EE CHANGE COMMANDS
QEXCCCM	M/36 CANCEL COMMANDS
QEXCCHR	S/36 EE HOLD/RELEASE COMMANDS
QEXCCJQ	S/36 JOBQ COMMAND/OCL PROCESSOR
QEXCCMG	MESSAGE CMD PROCESSING
QEXCCMM	SCAFFOLD CODE FOR MESSAGE QUEUE MODE SET
QEXCCMU	S/36 EE MENU COMMAND OR OCL STATEMENT
QEXCCMX	DISPLAY MESSAGES
QEXCCOF	S/36 EE MENU COMMAND OR OCL STATEMENT
QEXCCRT	M/36 START AND STOP COMMANDS
QEXCCTP	S/36 E RESTART PRT (T P) COMMAND
QEXCCVA	S/36 EE VARY COMMAND
QEXCHGCF	CHANGE S/36E ATTRIBUTES
QEXCHJCB	S/36 CHANGE JCB PROGRAM
QEXCHPOP	CHGS36A PROMPT OVERRIDE PROGRAM
QEXCIAD	ALLOCATE/DEALLOC OCL STATEMENT
QEXCIAF	S/36 E ALLOCATE FSB
QEXCIEP	S/36 ENV OCL EVOKE-PROMPT PROCESSOR
QEXCIER	INITIATOR ERROR
QEXCIES	END OF JOB STEP PROCESSOR
QEXCIFL	M/36 FILE PROCESSOR
QEXCIHP	HEAP ALLOCATE AND DEALLOCATE FUNCTIONS
QEXCILD	LOAD-INCLUDE-ATTR-LOCAL-SWITCH OCL
QEXCIML	S/36 ENVIRONMENT INITIATOR MAINLINE
QEXCIM0	LIBRARY-MEMBER-SYSLIST S/36 OCL STATEMTS
QEXCIM1	JOBQ-MENU-MSG-POWER-VARY-INFOMSG-LOG-
QEXCIM2	FORMS-IMAGE-REGION-RESERVE S/36 OCL STMT
QEXCIM3	COMPILE-COMM-DATA-SESSION S/36 OCL STMTS
QEXCIM4	ABEND-DEBUG-WAIT S/36 OCL STATEMENTS
QEXCIN	MCH/36 QEXCIML INITIALIZATION
QEXCINX	S/36 E NAME INDEX SERVICES
QEXCIPW	MACHINE 36 OCL PROCESSOR PRT-WRKSTATN
QEXCIRF	S/36 E REMOVE FSB
QEXCIRN	RUN OCL STATEMENT PROCESSOR
QEXCIRP	PRINTER OVERRIDE RUN EXTENTION
QEXCIRR	FUNCTION RE-ROUTE MODULE
QEXCIRY	S/36 E RELEASE-YES
QEXCISL	SYSLIST FUNCTIONS
QEXCITD	S/36 E FILE SUPPORT FOR TAPE/DISKETTE
QEXCLCML	CHGS36MSGL COMMAND PROCESSOR
QEXCLCMV	VALIDITY CHECK PGM FOR CHGS36MSGL CMD
QEXCLEF	EXTRACT FILE INFORMATION
QEXCLIN	QEXCLSS ASSOCIATED SPACE INITIALIZATION
QEXCLMS	WORKSTATION MSG HANDLING
QEXCLNCI	CLEAN UP CACHE FILE INDEX
QEXCLOSE	CLOSE S/36 E FILE FOR NATIVE COMMANDS
QEXCLRCI	CLEAR CACHE FILE INDEX FOR DLTLICPGM
QEXCLSG	MESSAGE HANDLER
QEXCLSS	SYSTEM/36 ENVIRONMENT SYSIN MAINLING
QEXCMCU	M/36 CLEAN UP MODULE
QEXCPENV	MCH/36 ENVIRONMENT PROCESSOR
QEXCPML	S/36 E COMMAND ANALYZER
QEXCPMN	M/36 COMMAND PROCESSOR
QEXCPRS	M/36 FIRST OPERAND ROUTER
QEXCPRT	M/36 COMMAND ROUTER
QEXCVTDV	CONVERT S/36 ENVIRONMENT DEVICE NAMES
QEXCVTSP	CONVERT SESSION PRINTER CONFIGURATION
QEXDBLB	CALL COMMAND ANALYZER
QEXENVIX	ENVIROMENT INVOCATION EXIT
QEXERQS	S/36 ENVIRONMENT EXEOJ PROCESSOR
QEXEXIT	M/36 INVOCATION EXIT
QEXEXO2	S/36E INSTALL EXIT PROGRAM
QEXFPGM	S/36 E FIND SUBROUTINE
QEXHMNU	S/36 EE HELP <MENU NAME> PROCESSOR
QEXIEVK	S/36 EE ICF EVOKE PROCESSOR
QEXIGCP	S/36 EE IGC SESSION PROCEDURE
QEXIGCX	IGC PROCESSING
QEXLTO	S/36 ENVIRONMENT LOAD-TO-OLD
QEXMKEY	S/36 EE ATTN/SYS REQ/APPL HELP FOR MRT
QEXMRTR	ROUTE TO A MRT & MRT INITIATION
QEXMRTW	S/36 EE WAIT-ON-LOCK SUPPORT FOR MRT
QEXOXRF	M/36 OXREF MODULE
QEXPDMP	DUMP JOB MODULE
QEXPRTCF	PRINT S/36 CONFIGURATION
QEXPTFAP	EXIT PGM TO APPLY S/36 E PTFS
QEXPVFN	S/36 E SPECIALIZED FUNCTIONS
QEXRCDBK	S/36 ENV ENABLE/DISABLE RECORD BLOCKING
QEXRCLBS	S/36 E HANDLER FOR RCLSTG OF QS36BTH
QEXRMVDE	REMOVE DEVICE ENTRY API
QEXRTMS	RETRIEVE MESSAGE
QEXRTVCF	RETRIEVE S/36E ATTRIBUTES
QEXSETLB	SET PRODUCT LIBRARY ROUTINE
QEXSHRO	S/36 ENV ENABLE/DISABLE SHARED DB OPEN
QEXSIGN	M/36 SIGNON PROCESSOR
QEXSIGNP	M/36 STRS36/STRS36PRC PROMPT OVRD PGM
QEXSTAT	M/36 STATUS COMMAND PROCESSOR
QEXSTEX	M/36 STATUS IEXIT PROGRAM
QEXTERM	S/36 ENVIRONMENT TRMS36 COMMAND CPP
QEZATNWD	OA ATTENTION KEY WINDOW PROGRAM
QEZAUT	RETRIEVE SPECIAL AUTHORITIES
QEZBCKUP	OA BACKUP
QEZBKADL	OA BACKUP - LIBRARY LIST EXTENSION PGM
QEZBKHST	OA UPDATE BACKUP HISTORY
QEZBKMSG	SEND BACKUP LOAD TAPE MESSAGE
QEZBKPOP	OA BACKUP PROMPT OVERRIDE PROGRAM
QEZBKSCD	BACKUP SCHEDULE
QEZBKSLT	OA SELECTION LIST FOR BACKUP
QEZBKWM	CHECK WHETHER TO RUN WEEKLY/MONTHLY BKUP
QEZCHBL	OA CHANGE BACKUP LIST
QEZCHBL2	OA CHANGE BACKUP LIST (OPTIONS)
QEZCHCLU	CHGCLNUP CPP
QEZCHGBK	OA CHANGE BACKUP OPTIONS CPP
QEZCHGOP	CHANGE OS/400 OPTIONS
QEZCHGPW	CHANGE IBM-SUPPL USER PASSWORDS

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QEZCHPRF  CHANGE OUTQ FOR PRINTER FILES
QEZCHPWS  CHGPWRSCH CPP
QEZCKCGF  OA BACKUP - CHECK FOR CHANGES IN FOLDERS
QEZCLDAT  CALCULATE CLEANUP CUTOFF DATE
QEZCLINT  CLEAN UP INTERFACE TO CL PGMS
QEZCLNMQ  CLEAN UP USER MESSAGE QUEUES
QEZCLNOQ  CLEAN UP OUTPUT QUEUES
QEZCLNUP  PERFORM CLEANUP ON OBJECTS IN INDEX
QEZCLOFC  CLEAN UP OFFICE RELATED ITEMS
QEZCLSLG  CLEAN UP JOURNALS AND SYSTEM LOGS
QEZCLSTG  OA CLEAN UP TEMP STORAGE
QEZCMPST  PROCESS COMPOSITE OBJECTS - OA RECLAIM
QEZCNPWR  CONFIRM POWER OFF
QEZCRBKL  OA BACKUP - CREATE A BACKUP LIST
QEZCRIDX  CREATE QEZPWRCLN
QEZDCSCD  DATA COLLECTION SCHEDULING
QEZDFTPM  GET PARMS NEEDED BY CL PGMS
QEZDOBJD  DISPLAY OBJECT DETAILS
QEZDSHST  DISPLAY BACKUP HISTORY
QEZDSPBK  OA DISPLAY BACKUP OPTIONS CPP
QEZDSSTS  DISPLAY SYSTEM STATUS
QEZENCLU  ENDCLNUP CPP
QEZEVTHL  OA CLEANUP/PWR SCHEDULER EVENT HANDLER
QEZEXCLU  CHGCLNUP PROMPT OVERRIDE PGM
QEZEXIT   INSTALL EXIT ROUTINE FOR OPER ASSISTANT
QEZEXPWS  CHGPWRSCH PROMPT OVERRIDE PGM
QEZGETMG  RECEIVE A MSG OFF OF A MESSAGE QUEUE
QEZGEXIT  GENERAL EXIT PROGRAM FOR REMOVE USER
QEZGRPGM  OA GROUP PROGRAM
QEZHNRPR  OA HANDLE REQUEST FOR PRINT
QEZINIT   OA INITIALIZE TAPE
QEZIXCLU  IEXIT PROGRAM FOR CLEANUP
QEZIXJOB  IEXIT FOR WORK WITH (BATCH) JOBS
QEZIXPWS  IEXIT PROGRAM FOR POWER ON/OFF SCHEDULE
QEZLSGNU  LIST SIGNED-ON USERS API
QEZLSGNU  QEZLSGNU API HEADER FOR CBL
QEZLSGNU  QEZLSGNU API HEADER IN RPG
QEZLSGNU  QEZLSGNU HEADER IN ILE/RPG
QEZLSGNU  QEZLSGNU HEADER IN ILE/COBOL
QEZLXPWS  LIST BUILDING PGM FOR POWER SCHEDULE
QEZMAIN   OA ATTENTION KEY PROGRAM
QEZMNAST  OA ASSIST MENU PANEL GROUP
QEZOPDEV  WORK WITH OPTIONS FROM WORK WITH DEVICE
QEZOPJOB  WORK WITH OPTIONS FROM WORK WITH JOBS
QEZOPSGN  OA WORK WITH SIGNED ON USERS OPTIONS
QEZPRDEV  PRINT LOCAL DEVICE ADDRESSES
QEZPRTDI  CPP FOR PRTDSKINF COMMAND
QEZRCLM   EZ VERSION OF RECLAIM STORAGE CODE
QEZRCVMG  RECEIVE MESSAGE
QEZRTCLU  RTVCLNUP CPP
QEZRTPWS  RTVPWRSCH CPP
QEZRTVBK  OA RETRIEVE BACKUP OPTIONS CPP
QEZRTVDI  CPP FOR RTVDSKINF COMMAND
QEZRUNBK  OA RUN BACKUP CPP
QEZRVLIB  OA BACKUP--WORK WITH INDEX ENTRIES
QEZSAVIN  SAVE PROBLEM HANDLING INFORMATION
QEZSCNEP  OA CLEANUP/SCHEDULE NEP
QEZSEPOB  SEPARATE OBJECTS OWNED INTO CLASSES
QEZSNDMG  SEND A MESSAGE API
QEZSNDM2  SEND A MESSAGE
QEZSNDM4  SELECT USERS
QEZSTCP   STRCLNUP & STRPWRSCH CPP
QEZSVIBM  OA BACKUP--IBM LIBRARIES
QEZS36E   DETERMINE IF IN S/36 ENVIRONMENT
QEZUSRPR  USER PROFILE FUNCTIONS FOR O/A
QEZWKSGN  OA WORK WITH SIGNED ON USERS
QEZWRAST  WORK WITH ASSISTANCE LEVEL
QEZWRCLU  WORK WITH CLEANUP PANELS
QEZWRDEV  WORK WITH DEVICES
QEZWRDSK  PRTDSKINF AND RTVDSKINF PANEL FLOW PGM
QEZWRJOB  OA WORK WITH (BATCH) JOBS
QEZWRPRT  OA WORK WITH PRINTED OUTPUT
QEZWRPWS  WORK WITH POWER ON/OFF PANELS
QEZWRWTR  OA WORK WITH WRITERS
QEZXTLPR  OA EXTEND LIST FOR PRINT
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QFICHECK  OS/400 BOSS OPT1 CHECK EXIT ROUTINE
QFIEXIT1  BOSS OPTION 1 ROUTER FOR FI EXITS
QFIINT2   EXIT PROGRAM TO MERGE OFFICE MESSAGES
QFIOCCVT  CALENDAR -QAOC* FILE - CONVERSION MODULE
QFIOCR30  CALENDAR EXIT PROGRAM
QFIOCR50  CALENDAR EXIT PROGRAM
QFIOCR70  CONVERSION FOR REMOTE DEFFILE 2D35
QFIOECVT  OE EXIT PROGRAM
QFIOFCSZ  DETERMINE SIZE OF OFFICE OBJECTS
QFIOFCVT  OFC LP DB FILE CONVERSION MODULE
QFIOFR50  OFC LP DB FILE CONVERSION MODULE
QFIOKCVT  OK EXIT PROGRAM
QFIOKR50  OK EXIT PROGRAM
QFIOMXIT  INVOCATION EXIT FOR QFIOMR50
QFIOSCVT  DIA-QAOS*- FILE CONVERSION MODULE
QFIOSR50  OS EXIT PROGRAM FOR V2R2
QFIROUTE  FI ROUTER FOR QUSRSYS EXIT PROGRAMS
QFIUPIPE  UPDATE QDOC IPE DURING OV/400 RST/DLT
QFNIOMGR  QFNIOMGR
QFNMNMBR  MANAGE FILE MEMBER
QFNMNTBL  QFNMNTBL
QFNREAD   QFNREAD
QFNREADI  QFNREADI
QFNROUTE  QFNROUTE - ROUTER PROGRAM
QFNSBMJB  QFNSBMJB
QFNWRT    QFNWRT
QFNWRTI   QFNWRTI
QFOREFD   RUNTIME MODULE FOR EXTFILED FUNCTION
QFOREOVR  RUNTIME MODULE FOR EXTOVR FUNCTION
QFORLIO   MAIN FORTRAN IO INTERFACE MODULE
QFPAADSV  ADD REMOTE SERVER
QFPACHAL  CHANGE NETWORK SERVER ALIAS
QFPACKAL  VALIDITY CHECKER FOR CHANGE NWS ALIAS
QFPACRAL  CREATE NETWORK SERVER ALIAS
QFPACRSG  CREATE NETWORK SERVER STORAGE SPACE
QFPADLAL  DELETE NETWORK SERVER ALIAS
QFPADLSG  DELETE NETWORK SERVER STORAGE SPACE
QFPADMAT  MATERIALIZE THE NWSD
QFPADSAL  DISPLAY NETWORK SERVER ALIAS
QFPADSSC  DISPLAY NETWORK SERVER STATISTICS
QFPADSSG  DISPLAY NETWORK SERVER STORAGE SPACE
QFPADSSN  DISPLAY NETWORK SERVER SESSION
QFPADSUS  DISPLAY NETWORK SERVER USERS
QFPALOCK  LOCK/UNLOCK CLIENT STORAGE UNIT
QFPANCMD  SUBMIT COMMAND TO NETWORK SERVER
QFPAPOAL  PROMPT OVERRIDE FOR CHANGE NWS ALIAS
QFPAPOSG  PROMPT OVERRIDE FOR CHANGE NWS STORAGE
QFPASBCM  SUBMIT NETWORK SERVER COMMAND
QFPASDMS  SEND NETWORK SERVER MESSAGE
QFPASEND  SPI- SEND FSIOP ADMIN COMMANDS TO FSIOP
QFPASHAR  START/END NETWORK SERVER SHARING
QFPASTRT  START LAN SERVER IN NETWORK SERVER
QFPAVARY  VARY EXITS FOR VARY SERVER
QFPAVCAL  VALIDITY CHECKER FOR CREATE NWS ALIAS
QFPAWWAL  WORK WITH NETWORK SERVER ALIASES
QFPAWWSG  WORK WITH NETWORK SERVER STORAGE SPACES
QFPAWWSN  WORK WITH NWS SESSION
QFPAWWST  DISPLAY NETWORK SERVER STATUS
QFPAWXAL  WORK WITH NWS ALIAS EXIT PROGRAM
QFPAWXSG  WORK WITH NWS STORAGE EXIT PROGRAM
QFPAWXSN  WORK WITH NWS SESSION EXIT PROGRAM
QFPAWXST  WORK WITH NWS STATUS EXIT PROGRAM
QFPAXXX1  EXTRA STUB MODULE FOR XPF FPAD
QFPAXXX2  EXTRA STUB MODULE FOR XPF FPAD
QFPAXXX3  EXTRA STUB MODULE FOR XPF FPAD
QFPAXXX4  EXTRA STUB MODULE FOR XPF FPAD
QFPAXXX5  EXTRA STUB MODULE FOR XPF FPAD
QFPDDELF  FAT ERASE FILE SPI
QFPDFSIZ  FAT FILE SIZE SPI
QFPDGETF  FAT GET FILE SPI
QFPDGETS  FAT GET SECTORS SPI
QFPDPUTF  FAT PUT FILE SPI
QFPDRNMF  FAT RE-NAME FILE SPI
QFPDRSIZ  FAT DISK SIZE SPI
QFPDSIZE  FAT DISK SIZE SPI
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QFPDTRNF FAT TRUNCATE FILE SPI
QFPHCRSS CREATE SERVER STORAGE SPACE
QFPHDELF FAT ERASE FILE SPI
QFPHDLSS DELETE SERVER STORAGE SPACE
QFPHERAS FAT ERASE FILE SPI
QFPHRNF FAT RE-NAME FILE SPI
QFPHVARY NWSD VARY ON/OFF EXIT PROGRAM
QFPPAREX FSIOP VARY ON PROCESSING
QFPPDELR FSIOP DELETE PTF RECORDS FROM QFPXQ
QFPPDEX FSIOP DISPLAY PTF ACTIVATION STATUS
QFPPEXIT FSIOP PTF INVOCATION EXIT
QFPPVARY FSIOP VARY ON PROCESSING
QFSCPVHM FMA QFSCPVHM MODULE
QFSC7TO8 FMA QFSC7TO8 MODULE
QFSC8TO7 FMA QFSC8TO7 MODULE
QFSDWN FMA QFSDWN MODULE
QFSMAIN FMA QFSMAIN MODULE
QFSPCINT FMA QFSPCINT MODULE
QFSSTRMA QFSSTRMA
QFSUFH FMA QFSUFH MODULE
QFSUPD FMA QFSUPD MODULE
QFSUPDWN FMA QFSUPDWN MODULE
QFVADDA ADD ACTIVITY - API
QFVAPVNA VERIFY AND NOTIFY CM AGENT
QFVCNVNL NODE LIST CONVERSION PROGRAM
QFVCRCHG CHANGE CHANGE REQUEST DESCRIPTION CPP
QFVCRCRT CREATE CHANGE REQUEST DESCRIPTION CPP
QFVCRIDX CRD INDEX OPERATIONS
QFVCRPX CHANGE CRQD PROMPTER EXIT
QFVLSTA LIST ACTIVITIES
QFVLSTA LIST ACTIVITIES API
QFVLSTA LIST ACTIVITIES
QFVLSTA LIST ACTIVITIES
QFVLSTA LIST ACTIVITIES
QFVLSTNL LIST NODE LIST ENTRIES API
QFVLSTNL QFVLSTNL API HEADER FOR CBL
QFVLSTNL QFVLSTNL API HEADER IN RPG
QFVLSTNL QFVLSTNL HEADER IN ILE/RPG
QFVLSTNL QFVLSTNL HEADER IN ILE/COBOL
QFVNODAE ADD NODE LIST ENTRY CPP
QFVNODCR CREATE NODE LIST CPP
QFVNODEX WRKNODLE UIM INCOMPLETE LIST PROCESSOR
QFVNODIX NODE LIST INVOCATION EXIT
QFVNODRE REMOVE NODE LIST ENTRY CPP
QFVNODWE COMMAND PROCESSOR FOR THE WRKNODLE CMD
QFVRMVA REMOVE ACTIVITY
QFVRTVCD RETRIEVE CRQD
QFVRTVCD RETRIEVE CHANGE REQUEST DESCRIPTION API
QFVRTVCD RETRIEVE CRQD
QFVRTVCD RETRIEVE CRQD
QFVRTVCD RETRIEVE CRQD
QFVRTVSL RETRIEVE MESSAGE API
QFVSVPRV NODL SAVE *PRV OBJECT HANDLER
QGDACFP GENERATED BY LC MACHINE FOR OWOS
QGDACIN STUB
QGDACTRM STUB
QGDACO STUB
QGDAEP STUB
QGDAINVP STUB
QGDASCPH STUB
QGDBADTM API CALL#23
QGDBARS API CALL QGD- -2 #1
QGDBASEL API CALL#32
QGDBATT API CALL#34
QGDBBGCI NEW 14 MODULE
QGDBBGS API CALL QGD- -2 #32
QGDBBLNK API CALL#25
QGDBCHRT API CALL QGD-
QGDBCHSG API CALL QGD-
QGDBCHVU API CALL#36
QGDBCONV API CALL QGD-
QGDBCRNG API CALL#39
QGDBDKEY API CALL QGD-#14
QGDBDOAX API CALL QGD-
QGDBDRAW API CALL QGD- -2 #33
QGDBDRAX API CALL QGD-#15
QGDBDRLB PGM TO DRAW ANGLED LABELS
QGDBDSAX API CALL QGD- -2 #34
QGDBDSDO API CALL QGD- -2 #9
QGDBDTTL API CALL QGD- -2 #54
QGDBEDTX API CALL#26
QGDBEMSG NEW 14 MODULE
QGDBGFMT API CALL#27
QGDBGFTX API CALL#38
QGDBGINT API CALL QGD-
QGDBGLBS API CALL QGD-
QGDBHIST API CALL#58
QGDBLABL API CALL QGD-#11
QGDBMAX API CALL#37
QGDBMBG NEW 14 MODULE
QGDBMISS API CALL QGD-
QGDBMOVE API CALL QGD- -2 #36
QGDBNOTE API CALL QGD-#8
QGDBPIE API CALL QGD- -2 #4
QGDBPLOT API CALL QGD-
QGDBRNIT API CALL#40
QGDBSET API CALL QGD-#16
QGDBSTRT API CALL#2
QGDBTRIG S/1 SIN/COSINE MODULE
QGDBVENN API CALL QGD- -2 #38
QGDCRTVS QGDCRTVS
QGDDBCRT STUB
QGDDBDEF STUB
QGDDBDEL STUB
QGDDBFN1 STUB
QGDDBFN2 STUB
QGDDBSEL STUB
QGDDCAS STUB
QGDDCCD STUB
QGDDCDS STUB
QGDDCES STUB
QGDDCGS STUB
QGDDCOS STUB
QGDDCPC STUB
QGDDCPS STUB
QGDDCPU STUB
QGDDCQD STUB
QGDDCQS STUB
QGDDCRS STUB
QGDDCTE STUB
QGDDCVS STUB
QGDDCWIN STUB
QGDDECRT STUB
QGDDEDEF STUB
QGDDEDEL STUB
QGDDEFN1 STUB
QGDDEFN2 STUB
QGDDESEL STUB
QGDDGAR STUB
QGDDGCE STUB
QGDDGCL STUB
QGDDGCR STUB
QGDDGCTF GD - COLOR TABLE FUNCTION
QGDDGGI STUB
QGDDGIG STUB
QGDDGIO STUB
QGDDGI1 GDF INITIALIZATION
QGDDGI4 GDP - PRINTER INITIALIZATION
QGDDGI5 STUB
QGDDGI6 STUB
QGDDGMM STUB
QGDDGPA STUB
QGDDGPC STUB
QGDDGPE STUB
QGDDGPI STUB
QGDDGPM STUB
QGDDGPO STUB
QGDDGPR STUB
QGDDGPS STUB
QGDDGP1 GDF PRODUCTION MANAGEMENT

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QGDDGP5   API CALL QGD-#4
QGDDGP6   STUB
QGDDGQC   STUB
QGDDGQI   STUB
QGDDGSE   STUB
QGDDGSQ   STUB
QGDDGS1   GDF SEGMENT MANAGEMENT
QGDDGS5   STUB
QGDDGWI   STUB
QGDDGXC   STUB
QGDDGXE   STUB
QGDDHIO4  GDP - PRINTER DEFAULTS TABLE
QGDDHIO5  STUB
QGDDHIO6  DEFAULTS TABLE MODULE FOR 7372 PLOTTER
QGDDHI14  4214 PRINTER DEFAULTS
QGDDHI24  4217 (@ 15 CPI) PRINTER DEFAULTS
QGDDHI34  QGDDHI34
QGDDM     AI - GENERAL GDDM ENTRY POINT
QGDDSDQ   STUB
QGDDSDS   STUB
QGDDSEH   STUB
QGDDSF1   STUB
QGDDSOO   STUB
QGDDSPCS  PC COMMUNICATIONS CONTROL
QGDDSQP   QUERY REPLY PROCESSOR FOR OS/2 LINK
QGDDSRO   STUB
QGDD1C    GDF DATASTREAM PROCESSOR
QGDD3C    DATASTREAM PROCESSOR FOR GOCA DEVICES
QGDD5C    API CALL QGD-#19
QGDEABND  SL GDDM ESI ABEND ROUTINE
QGDEOSDO  STUB
QGDEROOF  STUB
QGDEXITI  MRI EXIT PROGRAM FOR BOSS OPTION 14
QGDEXIT2  MRM EXIT PROGRAM FOR BOSS OPTION 14
QGDILASP  STUB
QGDLAR1F  STUB
QGDLIN1F  API CALL QGD-#3
QGDLQU1F  3270 DEVICE INITIALIZATION
QGDLRN1F  API CALL QGD- -2 #16
QGDLROPF  TSI - PRINTER IO ROUTER
QGDLROOO  TSI - DUMMY DEVICE ROUTER/HANDLER
QGDLRO1F  API CALL QGD-#18
QGDLTM1F  STUB
QGDLTQOO  TSI - QUERY DEVICE
QGDNUMER  STUB
QGDYGQC   STUB
QGDYINTM  STUB
QGDYROOO  STUB
QGDYRSRL  STUB
QGDYTRIG  STUB
QGSCRTRS  CREATE RESOURCE COMMAND PROCESSOR
QGSCRTSP  CREATE AFP RESOURCE FROM SPACE@
QGSDLTRS  DLTFNTRSC COMMAND PROGRAM
QGSDSPFN  DISPLAY FONT RESOURCE ATTRIBUTES CPP
QGSGETRS  GS GET RESOURCE DATA
QGSSAVFR  N TO N-1 FONT RESOURCE OBJECT HANDLER
QHCCCFG   PC SUPPORT CREATE AS/400 CONFIG OBJECTS
QHCQRYEX  EXIT PROGRAM FOR QUERY LINE DESCRIPTIONS
QHCQRYLN  PC SUPPORT QUERY RESPONSE LINES
QHEACT    HOST ENROLLMENT LIST ACTION PROCESSING
QHEENRL   PC SUPPORT TO ENROLL AS/400 USERS
QHEIEXIT  HOST ENROLLMENT INVOCATION EXIT MODULE
QHEWRKAL  WORK WITH PC SUPPORT AUTHORIZATION LIST
QHF       QHF HEADER FOR CBL
QHF       QHF API HEADER IN RPG
QHF       QHF HEADER IN ILE/RPG
QHF       QHF HEADER IN ILE/COBOL
QHFCHGAT  HFS CHANGE DIRECTORY ENTRY ATTRIBUTES
QHFCHGFP  HFS CHANGE FILE POINTER API
QHFCLODR  HFS CLOSE DIRECTORY API
QHFCLOSF  HFS CLOSE STREAM FILE
QHFCPYSF  HFS COPY STREAM FILE API
QHFCRTDR  HFS CREATE DIRECTORY API
QHFCTLFS  HFS CONTROL FILE SYSTEM
QHFDLTDR  HFS DELETE DIRECTORY API
QHFDLTSF  HFS DELETE STREAM FILE API
QHFDMCLN  CLEANUP HFS FILES AND DIRS
QHFDRGFS  DEREGISTER A FILE SYSTEM W/HFS
QHFDSPFS  HFS DISPLAY HIERARCHICAL FILE SYSTEMS
QHFFRCSF  HFS FORCE BUFFERED DATA IN STREAM FILE
QHFFXREG  REPAIR AND CREATE REG OBJECT
QHFGETSZ  HFS GET STREAM FILE SIZE
QHFIEXIT  HFS INVOCATION EXIT PROGRAM
QHFINT2   REGISTER FILE SYSTEMS ON INSTALL
QHFLSTFS  LIST REGISTERED FILE SYSTEMS
QHFLSTFS  QHFLSTFS API HEADER FOR CBL
QHFLSTFS  QHFLSTFS API HEADER IN RPG
QHFLSTFS  QHFLSTFS HEADER IN ILE/RPG
QHFLSTFS  QHFLSTFS HEADER IN ILE/COBOL
QHFLULSF  HFS LOCK/UNLOCK BYTES IN STREAM FILE
QHFMCEXT  HFS MOVE/COPY IEXIT PGM
QHFMOVSF  HFS MOVE STREAM FILE API
QHFOPNDR  HFS OPEN DIRECTORY API
QHFOPNSF  HFS OPEN STREAM FILE API
QHFRDDR   HFS READ DIRECTORY ENTRIES API
QHFRDDR   QHFRDDR API HEADER FOR CBL
QHFRDDR   QHFRDDR API HEADER IN RPG
QHFRDDR   QHFRDDR HEADER IN ILE/RPG
QHFRDDR   QHFRDDR HEADER IN ILE/COBOL
QHFRDSF   HFS READ STREAM FILE API
QHFRGFS   REGISTER A FILE SYSTEM W/HFS
QHFRNMDR  HFS RENAME DIRECTORY API
QHFRNMSF  HFS RENAME STREAM FILE API
QHFRSLEP  RESOLVE TO USER EXIT PROGRAM
QHFRTVAT  HFS RETRIEVE DIRECTORY ENTRY ATTRIBUTES
QHFSETSZ  HFS SET STREAM FILE SIZE
QHFWRTSF  HFS WRITE STREAM FILE API
QIAEXIT   IEXIT FOR TIA
QIATIA    TIA MODULE
QICCLOSE  CLOSE ROUTINE FOR ICDM
QICCONIN  ICF DISPLAY CONNECTION INFO PROCESSOR
QICERP    ICDM ERROR HANDLING MODULE
QICFMERR  ICF MODULE FOR FM GENERATED I/O ERRORS
QICFMTSL  ICDM FMTSLT PROCESSOR
QICGET    ICDM INPUT OPERATION PROCESSOR
QICINASP  ICDM - INIT PUT ASSOC SPACE
QICLSTEN  ICF GATHER ACTIVE SESSION INFO PROCESSOR
QICOPEN   ICDM FILE OPEN MODULE
QICPUT    ICDM PUT MODULE
QICRSTR   ICDM RESTORE PROCESSING
QICSPND   ICDM SUSPEND PROCESSING
QICTPP    ICDM TERMINATION PHASE PROCESSING
QIDAFW    IDDU DM LINK MODULE
QIDAK     IDDU KEYED FILE SUPPORT
QIDA2     CREATE AND SELECT FIELDS FOR A FORMAT
QIDA3     CREATE AND SELECT FORMATS FOR A FILE
QIDCD     IDDU CREATE DICTIONARY MODULE
QIDCDW    IDDU DM CREATE DICTIONARY MODULE
QIDCF     WORK WITH DATA BASE FILES PROCESSOR
QIDCHKFI  IDDU DICTIONARY NAME CHECK FUNCTION
QIDCV     OPEN LOGICAL DICTIONARY FILE
QIDC1     CHARACTER/IGC/NUMERIC FIELD OPTIONS
QIDDCV    IDDU INITIAL MODULE ROUTER
QIDDD     IDDU DEFINE DICTIONARY MODULE
QIDDDW    IDDU DM CHANGE DICTIONARY FUNCTION
QIDDESS   IDDU DESTROY SPACES INVOCATION EXIT PGM
QIDDESW   IDDU DELETE EDIT SPACE FUNCTION
QIDDT     IDDU SELECT DEFINITION TYPE
QIDD1     IDDU CHANGE FIELD DEFINITION MODULE
QIDD2     CREATE/CHANGE FORMAT DEFINITION MODULE
QIDD3     CREATE/CHANGE FILE DEFINITION MODULE
QIDED     IDDU EXIT DEFINITION PROCESS
QIDEDW    IDDU DM EXTRACT DICTIONARY INFO MODULE
QIDEM     EDIT MODE OPTIONS
QIDEXTW   EXTRACT DDS FROM FDT WORK MODULE
QIDE1     DESCRIBE NUMERIC FIELD EDITING
QIDE2     DESCRIBE DATE/TIME FIELD EDITING
QIDE3     SPECIFY EDIT CODE
QIDE4     SPECIFY EDIT WORD
QIDFVW    IDDU DM FILE VERIFICATION MODULE
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QIDF1	IDDU CREATE FIELD DEFINITION MODULE
QIDIN	IDDU INITIAL MODULE ROUTER
QIDKA	IDDU KEYED FILE SUPPORT
QIDKS	KEYBOARD SHIFT FOR CHARACTER/IGC/NUMERIC
QIDK1	CHANGE KEY FIELD SEQUENCE ATTRIBUTES
QIDK3	IDDU CHANGE FILE KEY ATTRIBUTES
QIDLLIB	SELECT A LIBRARY DISPLAY
QIDLS	SELECT A DATA DICTIONARY
QIDL1	SELECT A FIELD DEFINITION
QIDL2	SELECT A FORMAT DEFINITION
QIDL3	SELECT A FILE DEFINITION
QIDMODEL	CREATE/VERIFY IDDU DICTIONARY FILES
QIDMPW	IDDU DM IMPORT DEFINITION MODULE
QIDOCW	IDDU OPEN/CLOSE DICTIONARY FUNCTION
QIDOD	WORK WITH DICTIONARIES MODULE
QIDOF	WORK WITH DATA BASE FILES PROCESSOR
QIDOP	IDDU PRINT OPTIONS MODULE
QIDOR	IDDU RENAME DEFINITION MODULE
QIDO1	WORK WITH FIELD DEFINITIONS DISPLAY
QIDO2	WORK WITH RECORD FORMAT DEFINITIONS
QIDO3	WORK WITH FILE DEFINITIONS
QIDRC	IDDU DEFINITION RECOVERY MODULE
QIDRCMH	IDDU RECOVERY HANDLER FOR RECLAIM
QIDRI	IDDU RECORD IDS CODES
QIDRNW	IDDU RENAME DEFINITION FUNCTION
QIDRS1	DATA_DICTIONARY OBJECT RESTORE HANDLER
QIDSTRID	DISPLAY IDDU MENU
QIDSV1	DATA DICTIONARY OBJECT SAVE
QIDSYCW	IDDU SECURITY CHECK FUNCTION
QIDS1W	SAVE FIELD DEFINITION IN DICTIONARY
QIDS2W	SAVE FORMAT DEFINITION IN DICTIONARY
QIDS3W	SAVE FILE DEFINITIONS IN DICTIONARY
QIDTCW	IDDU DM TYPE CHECK DICTIONARY MODULE
QIDTDW	FILE DEFINITION DROP ENTRY POINT MODULE
QIDTOW	TRANSFER OWNERSHIP OF DATA DICTIONARY
QIDTUW	FILE DEFINITION DROP: WHAT USED LIST
QIDULW	IDDU DM UNLINK ALL FILES FROM DCT MODULE
QIDVD	IDDU DELETE DICT/DFN MODULE
QIDVDW	IDDU DM DELETE DICTIONARY MODULE
QIDVW	IDDU VIEW WHERE USE
QIDVXW	IDDU DELETE DEFINITION FUNCTION
QIDVY	CONFIRM COPY
QIDWUW	IDDU DICTIONARY WHERE USED: ENTRY MODULE
QIDWW	IDDU - IDDU SUPPORT
QIDWWW	IDDU - IDDU SUPPORT
QIDXD	IDDU EDIT LONG COMMENT
QIDXDDW	IDDU - EXTRACT DDS FROM DICTIONARY - CPP
QIDXPW	EXPORT DATA DICTIONARY
QIDXX	DEFINITION EXIT MODULE
QIDXXW	IDDU RESERVED MODULE
QIDYX	COPY DEFINITION
QIDYY	IDDU RESERVED MODULE
QIDYYW	IDDU RESERVED MODULE
QIDZZ	IDDU - IDDU SUPPORT
QIDZZW	IDDU - IDDU SUPPORT
QIFEXIT	TRCICF ERROR TRANSIENT MODULE
QIFPTREC	TRCICF OUTPUT DATA RECORDS
QIFTJOB	TRCICF COMMAND PROCESSING PROGRAM
QIFTRACE	TRCICF LOG TRACE DATA
QINCPF	INSTALLATION PART II DRIVER
QINERMSG	DISPLAY MESSAGE SCREEN
QINEXIT1	SECONDARY LANGUAGE INSTALL EXIT ROUTINE
QINEXIT2	SECONDARY LANGUAGE INSTALL EXIT ROUTINE
QININST	INSTALL PART 1 CONTROLLER
QINITT	INSTALLATION BOOTSTRAP
QINLDALO	LOAD ALL OBJECTS FOR CURRENT SRD
QINLDMRI	INSTALL MRI OBJECTS IN QSYS
QINLDSRD	LOAD S/R DESCRIPTOR FOR LIBRARY
QINOPTS	DISPLAY INSTALL OPTION SCREENS
QINPDEH	INSTALL PART 1 PROCESS DFLT EXCP HANDLER
QINPREP	INSTALL PREPARATION SECRET WEAPON
QINRIOOH	RESTORE I/O OBJECT HANDLER
QINSCRIO	INSTALL SCREEN I/O
QINSETUP	SET-UP FOR ANY TYPE INSTALL
QINTAPE	TAPE SUPPORT CODE
QINUPSL	HANDLE USER PROFILE STG LIMIT EXCEEDED
QIZACNUP	PERFORM CLEANUP ON OBJECTS IN INDEX
QIZACPST	PROCESS COMPOSITE OBJ - IZA RECLAIM
QIZARCLM	IZA VERSION OF RECLAIM STORAGE CODE
QIZARTVI	CPP FOR RTVINSINF COMMAND
QIZASOBJ	SEPARATE OBJECTS OWNED INTO CLASSES
QJOCAPPO	CHGRCYAP PROMPT OVERRIDE PROGRAM
QJOCDRJR	CREATE/DELETE/RESTORE JRN RECOVERY MOD
QJOCHGAP	CPP FOR THE CHGRCYAP COMMAND
QJOCHGJD	MODULE TO CHANGE JID XREF ENTRY
QJOCHGJN	CHANGE JOURNAL
QJOCHJNR	CHANGE JOURNAL RECOVERY MODULE
QJOCJOVR	CHGJRN PROMPT OVERRIDE PROGRAM
QJOCMPJE	COMPARE JOURNAL IMAGES CPP
QJOCRTJN	CPP FOR THE CRTJRN COMMAND
QJOCRTRC	CPP FOR THE CRTJRNRCV COMMAND
QJODFTJN	DEFAULT JOURNAL PROCESSING PROGRAM
QJODJAX	USREXIT ROUTINE FOR WRKJRNA DISPLAY
QJODLTJN	CPP FOR THE DLTJRN COMMAND
QJODLTRC	HANDLER FOR THE DLTJRNRCV COMMAND
QJODMGNT	JOURNAL RECEIVER DAMAGE NOTIVICATION
QJODRUPD	RECEIVER DIRECOTRY UPDATE MODULE
QJODSPJA	CPP FOR THE DSPJRNA COMMAND
QJODSPJE	CPP FOR THE DSPJRN COMMAND
QJODSPRC	CPP FOR THE DSPJRNRCV COMMAND
QJOEDTAP	CPP FOR THE EDT/DSPRCYAP COMMAND
QJOENDAP	END JOURNAL ACCESS PATH CPP
QJOENDJN	CPP FOR THE ENDJRN COMMAND
QJOFIXIT	PROCESS JOURNAL RECOVERY OBJECT
QJOGENJD	GENERATE JID/JOURNAL START MODULE
QJOIECHJ	CHANGE JOURNAL INVOCATION EXIT PROGRAM
QJOIEJRN	INVOCATION EXIT PROGRAM FOR JRNPF, JRNAP
QJOIPL	JOURNAL IPL PROCESSING PROGRAM
QJOJEJRC	JOURNAL/END-JOURNAL RECOVERY MODULE
QJOJMNUX	USREXIT ROUTINE FOR WRKJRN DISPLAY
QJOJNMNU	DSPJRNMNU COMMAND PROCESSING PROGRAM
QJOJNRCY	JOURNAL RECOVERY OPTION PROCESSOR
QJOJRNAP	JOURNAL ACCESS PATH CPP
QJOJRNPF	CPP FOR THE JRNPF COMMAND
QJOJSTAT	DSPJRNMNU MODULE - JOURNAL STATUS
QJOLGACT	ACTIVITY LOG PROGRAM
QJOMNEVT	DB/JO/TN EVENT MONITOR PROGRAM
QJOMTJOA	MATERIALIZE JOURNAL ATTRIBUTES FOR FCB
QJOMVOBJ	MOVE JOURNAL OBJECT
QJONJEVT	ENTRY NOT JOURNALED EVENT HANDLER
QJOREAPY	CPP FOR THE APYJRN/RMVJRN COMMAND
QJORECLM	JOURNAL RECLAIM PROCESSING PROGRAM
QJOREEXT	EXIT PROGRAM FOR QJOREAPY CPP
QJORETRY	EVENT HANDLER FOR RETRYING JRNL EVENTS
QJORJIDI	RETRIEVE JID INFORMATION
QJORJIDI	RETRIEVE JID INFORMATION
QJORJIDI	RETRIEVE JID INFORMATION API
QJORJIDI	QJORJIDI HEADER IN ILE/RPG
QJORJIDI	QJORJIDI HEADER IN ILE/COBOL
QJORNUSE	EVENT HANDLER FOR RCVR NOT IN USE EVT
QJORRDIR	RECEIVER DIRECTORY RECOVERY MODULE
QJORSTJN	OBJECT SPECIFIC RESTORE HNDLR - JOURNL
QJORSTRC	OBJECT SPECIFIC RESTORE HNDL - RECEIVR
QJORTHRS	EVENT HANDLER FOR RECVR THRESHOLD EVNT
QJORTVJE	RTVJRNE CPP
QJORUEVT	RECEIVER UNUSABLE EVENT HANDLER
QJORYDIR	DSPJRNMNU MODULE - RCV DIR RECOVERY
QJORYFIL	DSPJRNMNU MODULE - FILE RECOVERY
QJORYJRN	DSPJRNMNU MODULE - JOURNAL RECOVERY
QJORYRCV	DSPJRNMNU MODULE - RECEIVER RECOVERY
QJORYXRF	RECOVER RECEIVER JID CROSS REFERENCE
QJOSAVJN	OBJECT SPECIFIC SAVE HNDLR - JOURNAL
QJOSAVRC	OBJECT SPECIFIC SAVE HNDLR - RECEIVER
QJOSJRNE	SEND JOURNAL ENTRY API
QJOSMART	PROCESS THE SMART OBJECT
QJOSNDJE	CPP FOR THE SNDJRNE COMMAND
QJOUNJRN	UNJOURNAL ACCESS PATHS, JRN DAMAGED
QJOVLDCK	VALIDITY CHECKER FOR QJODSPJE
QJOVLIC	VLIC ERROR EVENT HANDLER
QJOXENNJ	ENTRY NOT JOURNALED EXCEPTION HNDLR

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QKACAJOB  DUMMY CPP FOR STRJOBCCH & ENDJOBCCH CMDS
QKACAPOL  DUMMY CPP FOR SETCCHPOOL CL COMMAND
QKJCPTBL  CPP FOR THE CL COMMAND CPYIGCTBL
QKJCRDCT  CREATE IDEOGRAPHIC IGC DICTIONARY CPP
QKJDSDCT  DISPLAY IDEOGRAPHIC DICTIONARY CMD CPP
QKJEDIT   EDIT IDEOGRAPHIC DICTIONARY COMMAND
QKJEDSEL  EDIT IDEOGRAPHIC DIATIONARY CMD - SELECT
QKJEROOT  EDIT IDEOGRAPHIC DICTIONARY CMD CPP
QKJFIXUP  FIX UP IGC TABLES
QKJHNTBL  HANDLE THE EXISTENCE OF AN IGC TABLE
QKJIGCNV  IDEOGRAPHIC CONVERSION FUNCTION
QKJMDWRD  MODIFY IGC WORDS
QKJRMENT  REMOVE A MAIN ENTRY FROM IGC DICTIONARY
QKJRTENT  RETRIEVE MAIN ENTRY FROM IGC DICTIONARY
QKJRTWRD  RETRIEVE IGC WORDS
QLCCRTCD  AUTOMATIC CREATE APPC CONTROL UNIT
QLCCRTLD  AUTO CREATE OF APPN LUDS
QLEASIN   ILE MATH AWIS
QLEATAN   ILE MATH AWIS
QLEATANH  ILE MATH AWIS
QLECOND   PM/SC CWIS
QLECPLX   ILE MATH AWIS
QLECPLX1  ILE MATH AWIS
QLECPLX2  ILE MATH AWIS
QLECPLX3  ILE MATH AWIS
QLECPLX4  ILE MATH AWIS
QLEDAGE   STANDARD DAGE ROUTINE
QLEDEH    ILE DEFAULT EXCEPTION HANDLERS
QLEDTAWI  ILE DATE AND TIME AWIS
QLEDTCOM  ILE DATE AND TIME COMMON
QLEDTIN   ILE DATE AND TIME INPUT
QLEDTOUT  ILE DATE AND TIME OUTPUT
QLEERF    ILE MATH AWIS
QLEEXIT   DAGE ROUTER SRVPGM
QLEEXP    ILE MATH AWIS
QLEGAMMA  ILE MATH AWIS
QLEGOTO   CEEGOTO
QLEIMF1   INTERNAL MATH FUNCTIONS
QLEIMF2   INTERNAL MATH FUNCTIONS
QLEIMF3   INTERNAL MATH FUNCTIONS
QLEIMF4   INTERNAL MATH FUNCTIONS
QLEINT1   ILE MATH AWIS
QLEINT2   ILE MATH AWIS
QLEIOUTL  I/O FEEDBACK ROUTINES
QLEIT     STATIC INIT/TERM
QLELOG    ILE MATH AWIS
QLEMFCWI  ILE MATH CWIS
QLEMFINI  INITIALIZE POINTERS TO THE MATH TABLES
QLEMOD    ILE MATH AWIS
QLEMRCR   CEEMRCR
QLEMS     CEE MESSAGE SERVICES
QLENCOD   ENCODE CONDITION AWIS
QLEOD     ILE OD AWIS
QLEODCWI  ILE OD CWIS
QLEPC     ILE PC AWIS
QLEPM     PM AWIS
QLERAGE   CEE4RAGE AWI
QLERAND   ILE RANDOM NUM GEN
QLERTX    CEERTX/CEEUTX
QLESC     COND HANDLING
QLESCAW   COND HANDLING AWIS
QLESGL    CEESGL
QLESIN    ILE MATH AWIS
QLESM     ILE SM AWIS
QLESSNFP  EXTERNAL FUNCTION POINTERS FOR SESSION
QLESSNIN  EXTERNAL PROGRAM TO INITIALIZE POINTERS
QLESSNSY  INTERNAL FUNCTIONS FOR SESSION
QLESSNUS  EXTERNAL ROUTINES FOR SESSION
QLETAN    ILE MATH AWIS
QLETANH   ILE MATH AWIS
QLETOOL   GENERAL LE TOOLS
QLETPS    CEE THREAD PRIVATE STORAGE
QLETREC   CEETREC & CEE4ABN
QLGCASE   QLGCASE  HEADER IN ILE/RPG
QLGCASE   QLGCASE HEADER IN ILE/COBOL
QLGCNVCS  QLGCNVCS API HEADER IN RPG
QLGCNVCS  QLGCNVCS HEADER IN ILE/RPG
QLGCNVCS  QLGCNVCS HEADER IN ILE/COBOL
QLGCNVSS  API TO CONVERT SORT SEQUENCE TABLE
QLGCVTUT  CONVERT TO/FROM UTC API
QLGDUM2   C DUMMY PROGRAM
QLGETTBL  GET LANGUAGE AND COUNTRY VALUES FRM PASA
QLGGLID   GIVEN LID GET LIB OF MRI API
QLGIEXIT  LG SORT API IEXIT PGM
QLGLDTBL  LOAD LANGUAGE AND COUNTRY TABLES IN PASA
QLGPGO01  TEMPORY PROGRAM FOR LG
QLGPGO02  TEMPORY PROGRAM FOR LG
QLGPMCHC  CHOICE PROMPT BUILDER
QLGPSID   DISPLAY/SELECT LANGUAGE & COUNTRY IDS
QLGPTLID  SELECT LANGUAGE ID
QLGRTVLI  API TO RETRIEVE LANGUAGE ID
QLGRTVLI  QLGRTVLI API HEADER FOR CBL
QLGRTVLI  QLGRTVLI API HEADER IN RPG
QLGRTVLI  QLGRTVLI HEADER IN ILE/RPG
QLGRTVLI  QLGRTVLI HEADER IN ILE/COBOL
QLGRTVSS  API TO RETRIEVE SORT SEQUENCE TABLE
QLGRTVSS  QLGRTVSS API HEADER FOR CBL
QLGRTVSS  QLGRTVSS API HEADER IN RPG
QLGRTVSS  QLGRTVSS HEADER IN ILE/RPG
QLGRTVSS  QLGRTVSS HEADER IN ILE/COBOL
QLGSCNMX  API TO SCAN STRING FOR MIXED DATA
QLGSORT   LGSORT API-SORT WITH NLSS
QLGSORT   QLGSORT API HEADER FOR CBL
QLGSORT   QLGSORT API HEADER IN RPG
QLGSORT   QLGSORT HEADER IN ILE/RPG
QLGSORT   QLGSORT HEADER IN ILE/COBOL
QLGSRTIO  LGSRTIO API-SORT INPUT/OUTPUT DATA
QLGSRTIO  QLGSRTIO API HEADER FOR CBL
QLGSRTIO  QLGSRTIO API HEADER IN RPG
QLGSRTIO  QLGSRTIO HEADER IN ILE/RPG
QLGSRTIO  QLGSRTIO HEADER IN ILE/COBOL
QLGTRDTA  API TO TRUNCATE CHARACTER DATA
QLGVLID   API TO VERIFY LANGUAGE ID
QLIADOPT  SET SPP FROM SYP UNDER OWNER PROFILE
QLICHGLB  CPP FOR CHGLIB
QLICHGLL  CHANGE LIBRARY LIST API
QLICHGOB  CPP FOR CHGLIB AND CHGOBJTXT COMMAND
QLICHLBL  ADD/REMOVE LIBRARY LIST ENTRY
QLICHLIB  CHANGE LIBRARY LIST CPP
QLICHLLE  CHANGE LIBRARY LIST MODULE
QLICKOBJ  CHECK OBJECT CPP
QLICLLIB  CLEAR LIBRARY CPP
QLICLNUP  CLEAN UP LIBRARIES DURING IMPL
QLICLPOP  PROMPTER OVERRIDE FOR CHGLIB COMMAND
QLICNACS  CONVERT ACS TABLE FUNCTION
QLICNV    CONVERT SYMBOLIC OBJECT TYPE
QLICOBJD  API TO CHANGE AN OBJECTS DESCRIPTION
QLICRDUP  CREATE DUPLICATE OBJECT CPP
QLICRLIB  CREATE LIBRARY CPP
QLICUSRL  CHANGE USER LIBRARY LIST MODULE
QLICVTTP  CONVERT OBJECT TYPE API
QLIDLCPF  DELETE CPF PROCEDURE
QLIDLFIL  DELETE FILE PROCESSING
QLIDLOBJ  DELETE OBJECT ROUTINE
QLIDLOIR  DELETE OIR MODULE
QLIDOBJD  DISPLAY OBJECT DESCRIPTION CPP
QLIDSLIB  DISPLAY LIBRARY CPP
QLIDSPLD  DISPLAY LIBRARY DESCRIPTION CPP
QLIDSPLL  DISPLAY LIBRARY LIST ROUTINE
QLIFITYP  TYPE FILES
QLIINSRT  INSERT OBJECT INTO LIBRARY
QLIINT1   FUNCTIONS FOR INSTALL TYPE 1
QLIINT2   LIBRARIAN PART 2 INSTALL MODULE
QLILBPOP  PROMPTER OVERRIDE FOR CHGLIBL COMMAND
QLILIST   LIST OBJECTS ROUTINE
QLILOBJI  QS API TO LIST OBJECT LOCKS
QLIMODRM  MODIFY RESOURCE MANAGEMENT CONTROLS
QLIMOVE   MOVE OBJECT UNDER OWNER PROFILE
QLIMROIR  MODIFY/RETRIEVE OIR ENTRIES
QLIMVOBJ  MOVE OBJECT CPP
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QLIMVOIR  MOVE OIR ENTRIES
QLINEPTE  EPTE NOT SUPPORTED
QLIODPOP  PROMPTER OVERRIDE FOR CHGOBJD COMMAND
QLIOUTFL  DATA BASE OUTFILE VERIFICATION/CREATE
QLIPGM01  STUB MODULE FOR QLIPGM01
QLIPGM02  STUB MODULE FOR QLIPGM02
QLIPGM03  STUB MODULE FOR QLIPGM03
QLIPGM04  STUB MODULE FOR QLIPGM04
QLIPGM05  STUB MODULE FOR QLIPGM05
QLIPGM06  STUB MODULE FOR QLIPGM06
QLIPGM07  STUB MODULE FOR QLIPGM07
QLIPGM08  STUB MODULE FOR QLIPGM08
QLIPGM09  STUB MODULE FOR QLIPGM09
QLIPGM10  STUB MODULE FOR QLIPGM10
QLIRCLIB  QLIRCLIB
QLIRCOBJ  RENAME OBJECT TYPE LIB IPL SUPPORT
QLIREINS  REINSERT OBJECT INTO QRPLOBJ LIBRARY
QLIRLIBD  RETRIEVE LIBRARY DESCRIPTION
QLIRLIBD  RETRIEVE LIBRARY DESCRIPTION API
QLIRLIBD  QLIRLIBD HEADER IN ILE/COBOL
QLIRLIBD  RETRIEVE LIBRARY DESCRIPTION
QLIRLIBD  RETRIEVE LIBRARY DESCRIPTION
QLIRNMO   RENAME OBJECT API
QLIRNMOG  GRANT AUTHORITY FOR RENAME OBJECT API
QLIRNOBJ  RENAME OBJECT CPP
QLIRNOIR  RENAME OIR
QLIROHDL  RSLOBJ MACRO EXCEPTION HANDLER
QLIRSLOJ  RSLOBJ PROGRAM, CALLED BY C MACRO
QLIRTVLD  RETRIEVE LIBRARY DESCRIPTION CPP
QLIRTVOB  RETRIEVE OBJECT DESCRIPTION CPP
QLISETSS  SET JOBS SORT SEQUENCE
QLISVLIB  HANDLER FOR SAVSYS FOR LIBRARIES
QLIVLOIR  VALIDATE OIR ENTRIES
QLMADPRF  BUILD CRS FRAMES FOR LMPRF
QLMADPRM  BUILD CRS FRAMES FOR LMRMV
QLMADRMV  RMVTRA COMMAND PROCESSING
QLMAICMD  ADDLANADPI VALIDITY/COMMAND PROCESSING
QLMBLDF   BUILD SMT REQUEST FRAME
QLMCICMD  CHGLANADPI VALIDITY/COMMAND PROCESSING
QLMCRSHD  SEND AND RECIEVE CRS FRAMES
QLMDSPLF  DSPTRNSTS COMMAND PROCESSOR
QLMDSPPF  DSPLANADPP FOR DDI
QLMDSPRF  DSPTRAPRF COMMAND PROCESSING
QLMDSREM  DSPTRNSTS COMMAND PROCESSOR
QLMEVTHD  TOKEN RING NETWORK MANGER EVENT HANDLER
QLMEXTEX  EXIT TO EXTEND UIM LISTS
QLMFVECT  PARSE MAJOR VECTOR TO FIND VECTOR
QLMREMHD  SEND AND RECIEVE REM FRAMES
QLMREMST  BUILD REM FRAMES FOR LMREM
QLMRICMD  RMVLANADPI VALIDITY/COMMAND PROCESSOR
QLMRNCMD  RNMLANADPI VALIDITY/COMMAND PROCESSOR
QLMRNGIF  BUILD CRS FRAMES FOR LMRING
QLMSMTHD  SEND AND RECEIVE SMT FRAMES
QLMUSREX  EXIT TO UPDATE UIM LISTS
QLMVALAD  VALIDITY CHECK ADAPTER ADDRESSES
QLMVALPR  VALIDITY CHECK DSPTRAPRF COMMAND
QLMVALRA  VALIDITY CHECK RMVTRA COMMAND
QLMVALRM  VALIDITY CHECK DSPTRNSTS COMMAND
QLMWKADF  WRKLANADPT/WRKHDWRSC COMMAND PROCESSING
QLMWKADP  WRKTRA COMMAND PROCESSING
QLMWKVAL  VALIDITY CHECK WRKLANADPT COMMAND
QLNRFSEQ  ILE COBOL DATA MANAGEMENT INTERFACE
QLPBATIN  BATCH INSTALLING LICENSED PGMS
QLPBCPCL  IEXIT PROGRAM FOR MP INSTALL QLPCTLIN
QLPBIPCL  IEXIT PROGRAM FOR QLPBATIN
QLPCLNUP  IEXIT PROCESSING FOR QLPINLPP/QLPINATO
QLPCRTDT  PROMPT FOR INSTALLATION PROFILE
QLPCTLIN  MP INSTALL BATCH CONTROLLING PROCESS
QLPDLCPR  DELETE LICENSED PROGRAM CPP
QLPDLTIP  DELETE AN INSTALLATION PROFILE
QLPDSPIN  DISPLAY LP INSTALL ACTIVITY
QLPEXIT   LPS QGPL/QUSRSYS LIBRARY EXIT PGM
QLPEXIT1  BOSS OPTION 1 EXIT PGM
QLPEXIT2  BOSS OPTION 1 MRI EXIT PGM
QLPEXTM   BOSS OPTION 1 ROUTER FOR FI EXITS
QLPHNDIP  HANDLE INSTALLATION PROFILES
QLPINATO  AUTOMATIC INSTALL EXECUTION MODULE
QLPINITP  INITIALIZE ACTIVE INSTALLATION PROFILE
QLPINLPP  LICPGM INSTALL LICENSED PROGRAMS
QLPINZCP  INZSYS COMMAND PROCESSOR
QLPIVPD   INSTALL VERIFICATION & PROB DETERMN
QLPLPRDS  API TO DISPLAY CONTENTS OF PRODUCT SAVF
QLPLPRDS  COBOL INCLUDE FOR API QLPLPRDS
QLPLPRDS  COBOL INCLUDE FOR API QLPLPRDS
QLPLPRDS  RPG OPM INCLUDE FOR QLPLPRDS API
QLPLPRDS  RPGLE INCLUDE FOR API QLPLPRDS
QLPOCINS  OPEN/CLOSE INSTALLATION PROFILES
QLPRPCPR  RESTORE LICENSED PROGRAM CPP
QLPRQEVT  REQIO EVENT HANDLER FOR TRANSFORM
QLPRTVDA  RETRIEVE THE PRODUCT DATA AREA
QLPSININ  SINGLE PROCESS INSTALL
QLPSVCPR  SAVE LICENSED PROGRAM CPP
QLPTRANS  MP INSTALL TAPE TRANSFORM ROUTINE
QLPWRKIP  WORK WITH INSTALLATION PROFILE
QLSADDTO  APPN INFORMATION ADD-TO PROGRAMS
QLSAPPNI  APPN INFORMATION MAINLINE
QLSDIR    APPN INORMATION DIRECTORY PROCESSING
QLSDSMOD  DISPLAY MODE STATUS
QLSENSSN  APPN INFO ENDPNT SESSION DATA RETRIEVAL
QLSINSSN  RETRIEVE INTERMEDIATE SESSION DATA
QLSLOG    APPN INFORMATION SESSION LOGGING ROUTINE
QLSMDADD  DISPLAY MODE STATUS LIST EXIT PROGRAM
QLSSSN    APPN INFORMATION SESSION MODULE
QLSSSNI   APPN INTERMEDIATE SESSION MODULE
QLSTDB    APPN INFO TOPOLOGY DATABASE PROCESSING
QLYGETS   GET STATUS OF BUILD INFORMATION SPACE
QLYRDBI   READ BUILD INFO FROM SPACE
QLYSETS   SET STATUS OF BUILD INFORMATION SPACE
QLYWRTBI  QLYWRTBI HEADER IN ILE/COBOL
QLYWRTBI  QLYWRTBI API HEADER FOR CBL
QLYWRTBI  WRITE BUILD INFO TO SPACE
QLYWRTBI  QLYWRTBI API HEADER IN RPG
QLYWRTBI  QLYWRTBI HEADER IN ILE/RPG
QLZA      QLZA HEADER IN ILE/COBOL
QLZA      QLZA API HEADER FOR CBL
QLZA      QLZA HEADER IN RPG
QLZA      QLZA HEADER IN ILE/RPG
QLZAADDC  ADDLICKEY CPP
QLZAADDK  ADD LICENSE KEY INFORMATION API
QLZAADDK  QLZAADDK HEADER IN ILE/COBOL
QLZAADDK  QLZAADDK API HEADER FOR CBL
QLZAADDK  QLZAADDK API HEADER IN RPG
QLZAADDK  QLZAADDK HEADER IN ILE/RPG
QLZAALK   ADD LICENSE KEY INFORMATION MPP
QLZACHG   CHANGE/RESET PEAK OPTION PROGRAM
QLZACHGP  CHGLICINF - PROMPT OVERRIDE PROGRAM
QLZACRT   CREATE LZA OBJECTS
QLZADDLI  ADD PRODUCT LICENSE INFORMATION API
QLZADDLI  QLZADDLI HEADER IN ILE/COBOL
QLZADDLI  QLZADDLI API HEADER FOR CBL
QLZADDLI  QLZADDLI API HEADER IN RPG
QLZADDLI  QLZADDLI HEADER IN ILE/RPG
QLZADSP   DISPLAY/PRINT LICENSE INFO OPTION PROGRA
QLZADSPC  DSPLICKEY CPP
QLZAGENK  GENERATE LICENSE KEY API
QLZAGENK  QLZAGENK HEADER IN ILE/COBOL
QLZAGENK  QLZAGENK API HEADER FOR CBL
QLZAGENK  QLZAGENK API HEADER IN RPG
QLZAGENK  QLZAGENK HEADER IN ILE/RPG
QLZAIEXT  UBP INVOCATION EXIT PROGRAM
QLZAINST  LZAINSTL MPP: INSTALL LICENSE FROM LP
QLZAIPL   UBP IPL CLEANUP
QLZAJOB   UBP JOB TERMINATION CLEANUP
QLZAMACP  RENAME LICENSE USER
QLZARCOV  RECOVER DAMAGED OR DESTROYED UBP OBJECTS
QLZAREQ   REQUEST LICENSE API
QLZARHND  SAVE/RESTORE OBJECT HANDLER FOR *UBPSPC
QLZARLK   RETRIEVE LICENSE KEY INFORMATION MPP
QLZARLS   RELEASE LICENSE API
QLZARMVC  RMVLICKEY CPP
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QLZARSPD  RESTORE OBJECT HANDLER FOR *PRDDFN
QLZARTV   QLZARTV HEADER IN ILE/COBOL
QLZARTV   QLZARTV API HEADER FOR CBL
QLZARTV   RETRIEVE LICENSE INFORMATION API
QLZARTV   QLZARTV API HEADER IN RPG
QLZARTV   QLZARTV HEADER IN ILE/RPG
QLZARTVI  RETRIEVE LICENSE INFORMATION INTERNAL
QLZARTVK  QLZARTVK HEADER IN ILE/COBOL
QLZARTVK  QLZARTVK API HEADER FOR CBL
QLZARTVK  RETRIEVE LICENSE KEY INFORMATION API
QLZARTVK  QLZARTVK API HEADER IN RPG
QLZARTVK  QLZARTVK HEADER IN ILE/RPG
QLZASAPD  SAVE OBJECT HANDLER FOR *PRDDFN
QLZASS1X  CHKPRDOPT EXIT PROGRAM
QLZAUPD   UPDATE LICENSE INFORMATION
QLZAUSRX  WORK LICENSE INFO UIM USER EXIT
QLZAWLUO  WORK WITH LICENSE USERS OPTION PROGRAM
QLZAWRK   WORK LICENSE INFO CPP
QL6ACERR  L6 APPC ERROR ROUTINE
QL6ACQ    L6 XLN SOURCE SIDE ACQUIRE SESSION
QL6ACQR   L6 TARGET XLN SESSION ACQUIRE
QL6ACRCV  L6 APPC RECEIVE DATA
QL6ACRT   L6 APPC ROUTER
QL6ATERM  L6 L6 APPC TERMINATION PROCEDURE
QL6CFAIL  L6 CONTROLLER FAILURE MODULE
QL6DCRCV  L6 DETACH/CONFIRM RECEIVE PROCESSOR
QL6EVRCV  L6 XLN TARGET LU RECEIVE
QL6EVSND  L6 XLN SOURCE EVOKE AND SEND
QL6IFRGT  L6 IMPLIED FORGET EVENT HANDLER
QL6INXDR  L6 LOCATION INDEX DAMAGE REPAIR
QL6LRPPP  QLUR PROCESS PROBLEM PHASE PROGRAM
QL6L6ERP  L6 ERROR PROCESSOR
QL6PSH    L6 PS HDR FORMATTER & CLASSIFY RESOURCE
QL6RCVCF  L6 SOURCE RECEIVE AN SEND CONFIRM
QL6RCVSD  L6 RESYNC SOURCE RECEIVE/SEND DETACH
QL6RLBLP  L6 BACKOUT LOOP
QL6ROLLB  L6 SEND A BACKOUT FMH-7 OR +RSP
QL6RSACQ  SOURCE RESYNC ACQUIRE MODULE
QL6RSRCV  L6 TARGET XLN RECEIVE +RSP
QL6RSSND  L6 SEND RESPONSE PROCESSO
QL6RSYNC  L6 SOURCE LU RESYNC PROCESSOR
QL6RXREV  L6 QLUR EVENT HANDLER
QL6STMGT  L6 STORAGE MANAGEMENT ROUTINE
QL6VRYOF  L6 LUD VARY OFF ROUTINE
QL6VRYON  L6 VARY ON MODULE
QL6XCSND  L6 TARGET RESYNC XLN AND CS SEND MODULE
QMAAUDIT  UPGRADE ORDER PROCESS AUDIT MODULE
QMABLDWO  WRKORDRQS SEND ORDER BUILD PGM
QMACNTIN  SAVE AND RETRIEVE CONTACT INFORMATION
QMACRTCF  CREATE SYSTEM CONFIGURATION FILE
QMACRTCT  CREATE SYTEM CONFIGURATION FILE     E
QMAEXTCT  UPGRADE ORDER PROCESS EXTRACT MODULE___
QMAFILE   UPGRADE ORDER PROCESS FILE RESOLVE  ___
QMAIEXIT  WORK WITH ORDER INFORMATION IEXIT
QMAMEDIA  UPGRADE ORDER PROCESS READ/WRIT TO MEDIA
QMAORDRQ  REQUEST ORDER ASSISTANCE UIM INTERFACE
QMAORDRV  REQUEST ORDER ASSISTANCE DRIVER MODULE
QMAPRSWO  WRKORDRQS SEND ORDER PARSE PGM
QMARETAN  EUOP VIA RETAIN MODULE
QMARQSOA  API FOR REQUEST ORDER ASSISTANCE
QMAWKORI  WORK WITH ORDER INFORMATION
QMHADRLE  ADD REPLY LIST ENTRY
QMHALMSQ  ALLOCATE MESSAGE QUEUE
QMHAPD    AUTOMATIC PROBLEM DETERMINATION
QMHBREVT  HANDLE BREAK MESSAGE EVENT
QMHCHGEM  CHANGE EXCEPTION MESSAGE API
QMHCHMSD  CHANGE MESSAGE DESCRIPTION
QMHCHMSF  CHANGE MESSAGE FILE
QMHCHMSQ  CHANGE MESSAGE QUEUE
QMHCHRLE  CHANGE REPLY LIST ENTRY
QMHCLOSE  CLOSE QDGENDSP
QMHCLSAP  CLOSE COMMAND ENTRY UIM APPLICATION
QMHCLVER  CREATE LOG VERSION
QMHCRJMQ  MODULE FOR QMHCRJMQ
QMHCRMSD  CREATE MESSAGE DESCRIPTION
QMHCRMSF  CREATE MESSAGE FILE
QMHCRMSQ  CREATE MESSAGE QUEUE
QMHCRTDQ  CREATE DATA QUEUE CPP
QMHCRTRL  CREATE REPLY LIST
QMHCTLJL  CONTROL JOB LOG OUTPUT
QMHCTLJL  QMHCTLJL HEADER IN ILE/COBOL
QMHCTLJL  QMHCTLJL API HEADER IN RPG
QMHCTLJL  QMHCTLJL HEADER IN ILE/RPG
QMHCVJMQ  CONVERT OLD JMQ TO NEW JMQ-PQS
QMHDLMS   DELETE MESSAGE
QMHDLMSD  DELETE MESSAGE DESCRIPTION
QMHDLMSQ  DELETE MESSAGE QUEUE
QMHDLVMS  DELIVER MESSAGE
QMHDMGNT  MESSAGE QUEUE DAMAGE NOTIFICATION  PGM
QMHDSEXT  DISPLAY PROGRAM MESSAGES *EXT
QMHDSMSD  DISPLAY MESSAGE DESCRIPTION
QMHDSMSF  DISPLAY MESSAGE FILE
QMHDSMSS  DISPLAY MESSAGES
QMHDSPJL  DISPLAY JOB LOG
QMHDSPLK  DISPLAY OBJECT LOCK SPECIAL HANDLER
QMHDSPRL  DISPLAY REPLY LIST ENTRIES
QMHDUPMQ  CREATE DUPLICATE MESSAGE QUEUE
QMHFLDMQ  FIX DAMAGED MESSAGE QUEUES
QMHFLTR   JOB LOG FILTER
QMHGSD    GENERAL SESSION DISPLAY
QMHJLDB   JOB LOG TO DB
QMHJLOG   WRITE JOB LOG
QMHJLOGO  WRITE JOB LOG FOR OLD JMQ
QMHLDISP  DISPLAY SYSTEM LOGS
QMHLINIT  SYSTEM LOG INITIALIZATION ROUTINE
QMHLJOBL  LIST JOB LOG MESSAGES
QMHLJOBL  LIST JOB LOG - API
QMHLJOBL  QMHLJOBL HEADER IN ILE/COBOL
QMHLJOBL  LIST JOB LOG MESSAGE
QMHLJOBL  QMHLJOBL HEADER IN ILE/RPG
QMHLOGER  LOG QHST ENTRIES TO DB FILE
QMHLSTEX  MESSAGE DESCRIPTION LIST EXIT FUNCTIONS
QMHLSTM   LIST NONPROGRAM MESSAGES
QMHLSTM   LIST STANDARD MESSAGE QUEUE MESSAGES
QMHLSTM   QMHLSTM HEADER IN ILE/COBOL
QMHLSTM   LIST NONPROGRAM MESSAGE
QMHLSTM   QMHLSTM HEADER IN ILE/RPG
QMHMFPOV  PROMPT OVERRIDE PROGRAM FOR MH COMMANDS
QMHMFSRH  MESSAGE FILE SEARCH
QMHMODQS  EXTEND/TRUNCATE MESSAGE QUEUES
QMHMOVPM  MOVE PROGRAM MESSAGES API
QMHMRCHK  CHECK MSG Q FOR MOVE/RENAME
QMHMRGMF  MERGE MESSAGE FILE
QMHMSSFL  ERROR MESSAGE DISPLAY MANAGER
QMHPDEH   PROCESS DEFAULT EXCEPTION HANDLER
QMHPOVR   PROMPT OVERRIDE PROGRAM FOR MH COMMANDS
QMHPQSEH  PQS THRESH-HOLD EVENT HANDLER
QMHPRMM   PROMOTE MESSAGE API
QMHPTMSD  PRINT MESSAGE DESCRIPTIONS
QMHQCRTQ  CREATE DATA QUEUE CPP
QMHQDLTQ  DELETE DATA QUEUE CPP
QMHQDRGQ  DEREGISTER DATA QUEUE
QMHQRDQD  QMHQRDQD HEADER IN ILE/COBOL
QMHQRDQD  RETRIEVE DESCRIPTON OF DATA
QMHQRDQD  RETRIEVE DATA QUEUE DESCRIPTION
QMHQRDQD  QMHQRDQD HEADER IN ILE/RPG
QMHQRDQD  RETRIEVE DATA QUEUE
QMHQREGQ  RECEIVE AND REGISTER DATA QUEUE
QMHQRSTQ  DATA QUEUE RESTORE OBJECT HANDLER
QMHQSAVQ  DATA QUEUE SAVE OBJECT HANDLER
QMHRCVIX  RECEIVE MESSAGE I-EXIT PROGRAM
QMHRCVM   QMHRCVM HEADER IN ILE/COBOL
QMHRCVM   RECEIVE NONPROGRAM MESSAGE
QMHRCVM   RECEIVE MESSAGE API
QMHRCVM   QMHRCVM HEADER IN ILE/RPG
QMHRCVM   RECEIVE NONPROGRAM MESSAGE
QMHRCVMS  RECEIVE MESSAGE CPP INTERFACE
QMHRCVPM  QMHRCVPM HEADER IN ILE/COBOL
QMHRCVPM  RECEIVE PROGRAM MESSAGE
QMHRCVPM  RECEIVE PROGRAM MESSAGE API
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QMHRCVPM QMHRCVPM HEADER IN ILE/RPG
QMHRCVPM RECEIVE PROGRAM MESSAGE
QMHRDQM QMHRDQM HEADER IN ILE/COBOL
QMHRDQM RECEIVE DATA QUEUE MESSAGE
QMHRDQM RETRIEVE DATA QUEUE MESSAGES
QMHRDQM QMHRDQM HEADER IN ILE/RPG
QMHRDQM RETRIEVE MESSAGE DATA QUEUE
QMHRLEX SYSTEM REPLY LIST EXIT FUNCTION
QMHRMFAT QMHRMFAT HEADER IN ILE/COBOL
QMHRMFAT QMHRMFAT API HEADER FOR CBL
QMHRMFAT RETRIEVE MESSAGE FILE ATTRIBUTES
QMHRMFAT QMHRMFAT API HEADER IN RPG
QMHRMFAT QMHRMFAT HEADER IN ILE/RPG
QMHRMQAT QMHRMQAT HEADER IN ILE/COBOL
QMHRMQAT RETRIEVE NONPROGRAM MESSAGE
QMHRMQAT RETRIEVE NON-PORGRAM MSGQ ATTRIBUTES
QMHRMQAT QMHRMQAT HEADER IN ILE/RPG
QMHRMQAT RETRIEVE NONPROGRAM MESSAGE
QMHRMRLE REMOVE REPLY LIST ENTRY
QMHRMVM REMOVE MESSAGE API
QMHRMVPM REMOVE PROGRAM MESSAGE API
QMHRPRQ REPLACE REQUEST
QMHRSNEM QMHRSNEM HEADER IN ILE/COBOL
QMHRSNEM QMHRSNEM API HEADER FOR CBL
QMHRSNEM RESEND EXCEPTION MESSAGE API
QMHRSNEM QMHRSNEM API HEADER IN RPG
QMHRSNEM QMHRSNEM HEADER IN ILE/RPG
QMHRSTMQ RESTORE MESSAGE QUEUE
QMHRSTPR RESET PRIORITY AFTER QMHAPD DUMPS
QMHRTMSS RETRIEVE MESSAGE
QMHRTNEX RETURN FROM EXCEPTION
QMHRTVM QMHRTVM HEADER IN ILE/COBOL
QMHRTVM RECEIVE MESSAGE
QMHRTVM RETRIEVE MESSAGE API
QMHRTVM QMHRTVM HEADER IN ILE/RPG
QMHRTVM RETRIEVEM MESSAGE
QMHRTVMS RETRIEVE MSG CPP INTERFACE
QMHRTVRQ QMHRTVRQ HEADER IN ILE/COBOL
QMHRTVRQ RETRIEVE REQUEST MESSAGE
QMHRTVRQ RETRIEVE REQUEST MESSAGE
QMHRTVRQ QMHRTVRQ HEADER IN ILE/RPG
QMHRTVRQ RETRIEVE REQUEST MESSAGE
QMHSAVMQ SAVE MESSAGE QUEUE
QMHSCLVL DISPLAY ADDITIONAL MESSAGE INFO
QMHSCPEV SCOPE PGM NOT INVOKED HANDLER
QMHSNBRK SEND BREAK MESSAGE
QMHSNDBM SEND BREAK MESSAGE API
QMHSNDM SEND MESSAGE API
QMHSNDPM SEND PROGRAM MESSAGE API
QMHSNDRM SEND REPLY MESSAGE API
QMHSNDSM SEND SCOPE MESSAGE API
QMHSNEVT SEND NECESSARY EVENTS FOR MSG SENT
QMHSNINQ SEND INQUIRYING TYPE MESSAGE
QMHSNMSG SEND MESSAGE - SNDMSG COMMAND
QMHSNPGM SEND PROGRAM MESSAGE - SNDPGMMSG CMD
QMHSNRPL SEND REPLY
QMHSNRQ SEND REQUEST
QMHSNSTA SEND STATUS MESSAGE
QMHSNSTQ SEND MESSAGE TO STANDARD MESSAGE QUEUE
QMHTSEVT HANDLE CHGJOB BRKMSG CHANGES
QMHUNMSG UNMONITORED MESSAGE ROUTINE
QMHVFYLT VERIFY IF LIGHT IS TO BE TURNED ON
QMHWRMSS WORK WITH MESSAGES
QMNCMDPM QMNCMDPM
QMNCONFG CONFIGURATION MENU CONTROLLER
QMNDSPWS DISPLAY WORK STATION USER
QMNHCMD PROCESS CMD GROUP CMDS
QMNPASWD CHECK PASSWORD CPP
QMNSBS EXT SBS NAME CPP
QMNSELCT SLTCMD ROUTINE
QMNSYSRQ SYSTEM REQUEST MENU
QMNUIM DISPLAY A UIM PANEL
QMNWRKDS DISPLAY ROUTINE FOR WRKF
QMNWRKXX WORK WITH OBJ CPP
QMNWRKX1 WRKOBJ DELETE ROUTINE
QMNWRKX2 WORK WITH CMD DELETE ROUTINE
QMODIA59 ADOPT QSYS, ISSUE DIAG 59
QMODLTOT DELETE OPTICAL TABLES
QND5CDIS 5394 ON LU62 INIT CD ASSOCIATED SPACE
QND5ITRM 5394 ON LU62 INVOCATION EXIT PROGRAM
QND5MAIN 5394 ON LU62 TRANSACTION PROGRAM
QND5VRYO 5394 ON LU62 VARY OFF CD
QNFBROWS BROWSE PHYSICAL FILE MEMBER
QNFCLRQ CLEAR RECIPIENT QUEUE
QNFCNJOP PROMPT OVERRIDE PROGRAM
QNFDSPRC DISPLAY NETWORK FILES
QNFDSTRB DISTRIBUTE DATA TO LOCAL USERS
QNFIEXIT NF INVOCATION EXIT PROGRAM
QNFJOBAU ADD/CHG/RMV NETWORK JOB ENTRY
QNFJOBDS DISPLAY NETWORK JOB ENTRIES
QNFPACK COPY DATA TO FILE SERVER OBJECT
QNFRBLDQ REBUILD NF MESSAGES ON RECIPIENT QUEUE
QNFRCDTA CANCEL/RECEIVE NETWORK FILE
QNFRCLNF RECLAIM NETWORK FILE OBJECTS
QNFREPAK REBLOCK RSCS DATA IN FILE SERVER OBJECT
QNFRNUSR RENAME DIRECTORY ENTRY
QNFSBMTP SUBMIT TRANSACTION PROGRAM JOB
QNFSNDTA SEND NETWORK FILE
QNFSNMSG SEND NETWORK MESSAGE
QNFSNSPL SEND NETWORK SPOOLED FILE
QNFTPDTA TRANSACTION PROGRAM FOR DATA
QNFUNPAK REFORMAT DATA INTO RECEIVING FILE
QNFUSREX UIM USER EXIT PROGRAM
QNMACEH SNA/MS APPL CTL EVENT HANDLER
QNMACIE SNA/MS APPL CTL INVOC EXIT
QNMACP1 SNA/MS APPLICATION PROCESS 1
QNMACQFP SNA/MS ACQUIRE FOCAL POINT
QNMADSCE ADD SOC ENTRY CPP
QNMADSCM ADD SOC ENTRY MACRO
QNMAMEH SNA/MS ASSOC MGR EVT HANDLER
QNMAMEP SNA/MS ASSOC MGR ENTRY POINT
QNMAMGR SNA/MS ASSOCIATION MANAGER
QNMAMRC SNA/MS MS CAPABILITIES RECEIVER
QNMAMSC SNA/MS MS CAPABILITIES SENDER
QNMAMSL NM/MS SEND FOCAL POINT LOOP DETECTION MV
QNMAMSOC SNA/MS SOC MANAGER
QNMAPCTL SNA/MS APPLICATION CONTROL
QNMAPYFR APPLY FILTER API
QNMCHGMN SNA/MS CHANGE MODE NAME
QNMDLSCM DELETE SOC ENTRY MACRO
QNMDPSOC DISPLAY SOC STATUS CPP
QNMDRGAP SNA/MS TRANSPORT DEREGISTER APPLICATION
QNMDRGFN DEREGISTER FOR FILTER NOTIFICATIONS
QNMDRGTI DEREGSITER FOR APPN TOPOLOGY INFO API
QNMENDAP SNA/MS END APPLICATION API
QNMEVK MS XPORT EVOKED PROGRAM
QNMFRAAE COMMAND PROCESSOR FOR THE ADDXXXACNE CMD
QNMFRASE COMMAND PROCESSOR FOR THE ADDXXXSLTE CMD
QNMFRAXT WRKFTRACNE COMMAND UIM EXIT PROCESSOR
QNMFRCAE COMMAND PROCESSOR FOR THE CHGXXXACNE CMD
QNMFRCH CHANGE FILTER
QNMFRCR CREATE FILTER
QNMFRCSE CHGXXXSLTE COMMAND PROCESSING PROGRAM
QNMFRIXT FILTER PROCESSING INVOCATION EXIT
QNMFRMAE WRKFTRACNE - MOVE/RENAME ACTION ENTRY
QNMFRMSE WRKFTRSLTE - MOVE/COPY SELECTION ENTRY
QNMFRPRS SELECTION ENTRY PARSER
QNMFRPX CHGXXXFTR PROMPTER EXIT PROGRAM
QNMFRRAE COMMAND PROCESSOR FOR THE RMVFTRACNE CMD
QNMFRRSE COMMAND PROCESSOR FOR THE RMVFTRSLTE CMD
QNMFRSPX CHGXXXSLTE PROMPTER EXIT PROGRAM
QNMFRSXT WRKSLTE COMMAND UIM EXIT PROCESSOR
QNMFRUPR SELECTION ENTRY UNPARSER
QNMFRWAE COMMAND PROCESSOR FOR WRKFTRSLTE CMD
QNMFRWK COMMAND PROCESSOR FOR THE WRKFTR CMD
QNMFRWSE COMMAND PROCESSOR FOR THE WRKSLTE CMD
QNMFRXT WRKFTR LIST EXIT
QNMFRXTP WRKFTR LIST EXIT FOR PRINTING
QNMINDEX FILTER INDEX OPERATIONS
QNMMSTEH SNA/MS TRANSPORT EVENT HANDLER

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QNMRCVDT  MS TRANSPORT RECEIVE DATA API
QNMRCVDT  QNMRCVDT HEADER IN ILE/COBOL
QNMRCVDT  QNMRCVDT API HEADER FOR CBL
QNMRCVDT  QNMRCVDT API HEADER IN RPG
QNMRCVDT  QNMRCVDT HEADER IN ILE/RPG
QNMRCVOC  SNA/MS TRANSP RCV DATA OPERATION COMPL
QNMREGAP  SNA/MS TRANSPORT REGISTER APPLICATION
QNMRGFN   QNMRGFN HEADER IN ILE/COBOL
QNMRGFN   QNMRGFN API HEADER FOR CBL
QNMRGFN   REGISTER FOR FILTERING NOTIFICATION
QNMRGFN   QNMRGFN API HEADER IN RPG
QNMRGFN   QNMRGFN HEADER IN ILE/RPG
QNMRGTI   QNMRGTI INCLUDE ILE/RPG
QNMRGTI   QNMRGTI API HEADER FOR CBL
QNMRGTI   REGISTER FOR TOPOLOGY INFORMATION API
QNMRGTI   QNMRGTI API HEADER IN RPG
QNMRGTI   QNMRGTI HEADER IN ILE/RPG
QNMRMSCE  REMOVE SOC ENTRY CPP
QNMRRGF   QNMRRGF HEADER IN ILE/COBOL
QNMRRGF   QNMRRGF API HEADER FOR CBL
QNMRRGF   RETRIEVE REGISTERED FILTERS API
QNMRRGF   QNMRRGF API HEADER IN RPG
QNMRRGF   QNMRRGF HEADER IN ILE/RPG
QNMRTVFP  SNA/MS TRANSPORT RETRIEVE FOCAL POINT
QNMRTVMN  SNA/MS TRANSPORT RETRIEVE MODE NAME
QNMSNDER  SNA/MS TRANSPORT SEND ERROR
QNMSNDRP  SNA/MS TRANSPORT SEND REPLY
QNMSNDRQ  SNA/MS TRANSPORT SEND REQUEST
QNMSOCXT  EXIT PROGRAM FOR WRKSOC PANEL PROCESSING
QNMSTRAP  MS START APPLICATION
QNMTEXIT  SNA/MS TRANSPORT JOB TERMINATION
QNMTIEH   NM TOPOLOGY INFORMATION EVENT HANDLER
QNMTIEXT  SNA/MS TRANSPORT INVOCATION EXIT
QNMTIXT   INVOCATION EXIT FOR NM TOPOLOGY APIS
QNMWKSOC  WORK WITH SOC CPP
QNPSEXFD  EXTRACT PRINTER DEVICE FILE ATTRIBUTES
QNPSXPFD  EXTRACT PRINTER DEVICE FILE ATTRIBUTES
QNXDMCLN  CLOSE JOBS NX WORKSTATION PRINTERS
QNXENDC   END CONNECTION
QNXERROR  NX UNSOLICITED DATA HANDLER
QNXIEXIT  NX API INVOCATION EXIT PROGRAM
QOCAUTO   AUTOMATICALLY PROCESS MEETING NOTICES
QOCCADRD  ADDRMTDFN COMMAND CPP
QOCCCHRD  CHGRMTDFN COMMAND CPP
QOCCDPRD  DSPRMTDFN COMMAND CPP
QOCCHITM  CHANGE CAL ITEM(S) PROGRAM (CHGCALIT)
QOCCHKCF  CHECK CALENDAR CONFLICTS PROGRAM
QOCCHPOP  CHGRMTDFN COMMAND POP OVERIDE
QOCCPP    CALENDAR SERVICE CPP
QOCCRITM  CREATE CAL ITEMS PROGRAM - CRTCALIT
QOCCRMRD  RMVRMTDFN COMMAND CPP
QOCCTLOF  STR/END/CHK OFFICE SERVICES API
QOCCWKRC  WRKRMTDFN COMMAND CONFIRM INPUT
QOCCWKRD  WRKRMTDFN COMMAND CPP
QOCCWKRP  WRKRMTDFN COMMAND POSITIONTO
QOCCWKRR  WRKRMTDFN COMMAND CONFIRM REMOVE
QOCCWKRU  WRKRMTDFN COMMAND UPDATE LIST
QOCDLITM  DELETE CAL ITEM(S) PROGRAM (DLTCALIT)
QOCDUMP   DUMP CALENDAR DATA AREAS
QOCEMNTI  EMN TO RFTAS400 DOCUMENT TRANSFORM
QOCEVOKE  CALENDAR TPN EVOKE PROGRAM
QOCEXIT   CALENDAR TERMINATION
QOCGTITM  GET CALENDAR ITEMS PROGRAM -GETCALIT
QOCINIT   CALENDAR INITIALIZATION
QOCLOADM  RELOAD TRANSLATABLE CONSTANT TABLE
QOCNFYMG  NOTIFY CALENDAR MANAGER PROGRAM
QOCOLEMN  OLD-NOTICE TO EMN DOCUMENT TRANSFORM
QOCPCAL   PROCESS CALENDAR PROGRAM (?XXXCAL)
QOCPGRP   PROCESS GROUPS PROGRAM (?XXXGRP)
QOCPINV   PROCESS INVITEE LIST PROGRAM - OCPRCINV
QOCPNTC   PROCESS MEETING NOTICES
QOCPTABB  PARSING TABLE FOR INTERNODAL CAL B
QOCPTABL  PARSING TABLE FOR INTERNODAL CALENDAR
QOCRNUSR  RENAME USER ID IN CALENDAR FILES
QOCVFYTM  VERIFY CALENDAR TIME PROGRAM
QOCXELP   DOCUMENT REQUEST EXECUTION
QOCXLTB   LOAD CONSTANT MESSAGE TABLE
QOCXNODE  CAL SERVICE INTERNODAL REQUEST ROUTER
QODADIR   HFS FOR DIRECTORY OPERATIONS
QODAINIT  INITIALIZATION SETUP FOR HFS FUNCTIONS
QODALMAP  DLO STORAGE MANAGEMENT
QODALOCK  HFS FOR LOCK/UNLOCK DATA SPACE
QODAMAIN  HFS FOR OPEN, READ, WRITE ETC FOR FILES
QODAMCDR  HFS FOR MOVE, COPY, DELETE AND RENAME
QODARGFS  REGISTER THE DLS FILE SYSTEM WITH API
QODATERM  TERMINATION CLEANUP FOR HFS FUNCTIONS
QODAUDIT  CREATE AUDITING ENTRY FOR DLOS
QODCHKCP  STUB MODULE FOR BUILDS
QODCHKEY  QDLS CHECKIN/CHECKOUT DOCUMENT
QODCHKVC  STUB MODULE FOR BUILDS
QODCLOSE  CLOSE DOCUMENT/FOLDER
QODCPPIX  CPP MODULES IEXIT HANDLER
QODCPYCP  COPY DOCUMENT CPP
QODCPYD   COPY DOCUMENT
QODCPYDS  COPY DATA STREAM
QODCPYTX  STUB MODULE FOR BUILDS
QODCPYVC  COPY DOC VALIDITY CHECKER PROGRAM
QODCRT    CREATE FOLDER OR DOCUMENT
QODCRTCP  CREATE FOLDER CPP
QODCRTSP  CREATE SECONDARY SPACE FOR FMS OBJECT
QODCRTVC  CRTFLR VALIDITY CHECKER PROGRAM
QODCVTCR  CONVERT DLO TO CURRENT RELEASE
QODDLSMA  DLS MODULE INTERFACE FOR HLL APPLICATION
QODDLT    DELETE FOLDER OR DOCUMENT
QODDLTAR  DELETE ASSOCIATE RECORD MODULE
QODDLTCP  DELETE DLO CPP
QODDLTDL  DELETE FMS OBJECTS FROM QTEMP
QODDLTDS  DELETE DATA STREAM
QODDLTTX  DELETE TEXT MODULE
QODDLTVC  DLTDLO VALIDITY CHECKER PROGRAM
QODDMPCP  DMPDLO CPP
QODDMPVC  DMPDLO VALIDITY CHECKER PROGRAM
QODDUMP   DUMP DOCUMENT LIBRARY OBJECT
QODDUMP2  QDLS DUMP PROGRAM
QODENSUR  ENSURE DOCUMENT/FOLDER OBJECTS
QODFIND   FIND DOCUMENT/FOLDER
QODFIXDB  FIX DIA DATABASE ANCHOR RECORD
QODFSO    RECOVER FSO
QODGETA   GET DOC/FLR ATTRIBUTES
QODGETAR  GET ASSOCIATE RECORD MODULE
QODGETDS  GET DATA STREAM
QODGETP   GET DOC/FLR PROFILE
QODGETTX  GET TEXT
QODIDXC   DOCUMENT INDEXING COMPLETE
QODINFTX  GET INFORMATION TEXT MODULE
QODINIT   FMS SESSION INITIALIZATION
QODIPL    FMS IPL PROGRAM
QODLCKDS  LOCK DATA STREAM
QODLIST   LIST DOCUMENTS/FOLDERS
QODLMRVY  LIST MANAGEMENT RECOVERY MODULE
QODLSTOB  OD LIST OBJECT MODULE
QODMISC1  LOG DOCUMENT/FOLDER SECURITY ERRORS
QODMISC2  STUB MODULE FOR BUILDS
QODMISC3  STUB MODULE FOR BUILDS
QODMISC4  FMS DUMMY EPT MODULE #4
QODMISC5  FMS DUMMY EPT MODULE #5
QODMOVCP  MOVE DOCUMENT CL COMMAND PROCESSOR
QODMOVD   MOVE DOCUMENT
QODMOVVC  MOVE DOCUMENT CL CMD VALIDITY CHECKER
QODOBJSZ  RETRIEVE DLO SIZE
QODOPEN   OPEN FOLDER AND/OR DOCUMENT
QODPUTA   PUT DOC/FLR ATTRIBUTES
QODPUTAR  PUT ASSOCIATE RECORD MODULE
QODPUTDS  PUT DATA STREAM
QODPUTP   PUT DOC/FLR PROFILE
QODPUTTX  PUT TEXT MODULE
QODRCL    RECLAIM DOCUMENT/FOLDER
QODRCLCP  RCLDLO CPP
QODRCLVC  RCLDLO VALIDITY CHECKER PROGRAM
QODRDKEY  READ ASSOCIATE RECORD KEY(S)
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QODRECLM	RECLAIM STORAGE FOR FMS OBJECTS
QODRGZ	DOCUMENT REDUCTION MODULE
QODRGZCP	REORGANIZE DOCUMENT CPP
QODRGZVC	VALIDITY CHECKER FOR RGZDOC
QODRNM	RENAME FOLDER OR DOCUMENT
QODRNMCP	RENAME DLO CPP
QODRNMVC	RNMDLO VALIDITY CHECKER PROGRAM
QODROOT	RECOVER *ROOT FOLDER
QODRSTDL	MULTI-SPACE OBJECT HANDLER FOR RSTDLO
QODRTVCP	CPP FOR RTVDLONAM AND DSPDLONAM COMMANDS
QODRTVVC	VCP FOR RTVDLONAM AND DSPDLONAM COMMANDS
QODSAVDL	MULTI-SPACE OBJECT HANDLER FOR SAVDLO
QODSRPOS	RESTORE DIA DB POST-EXIT PROGRAM
QODSRPRE	RESTORE DIA DB PRE-EXIT PROGRAM
QODSWFIN	OD V3R1M0 SWFL CONVERSION
QODSWFL	RECOVER SWFL
QODSWILL	OD SYSTEM WIDE LADN LIST
QODSWRL	FMS SYSTEM WIDE RECOVERY LIST
QODTERM	FMS SESSION TERMINATION
QODXITPG	FMS EXIT PROGRAM API
QODXRTCD	TRANSLATE RETURN CODE TO EXCEPTION
QOEAS	BUILD EDITOR ROOT MODULE ASP
QOEAUT	RETRIEVE PLATFORM DATA AREA
QOEBO1	BIDIRECTIONAL LANGUAGE MODULE 1
QOEBO2	BIDIRECTIONAL LANGUAGE MODULE 2
QOEBO3	BIDIRECTIONAL LANGUAGE MODULE 3
QOEBO4	BIDIRECTIONAL LANGUAGE MODULE 4
QOEBO5	BIDIRECTIONAL LANGUAGE MODULE 5
QOEBO6	BIDIRECTIONAL LANGUAGE MODULE 6
QOEBO7	BIDIRECTIONAL LANGUAGE MODULE 7
QOEBO8	BIDIRECTIONAL LANGUAGE MODULE 8
QOEBO9	BIDIRECTIONAL LANGUAGE MODULE 9
QOEB10	BIDIRECTIONAL LANGUAGE MODULE 10
QOEB11	BIDIRECTIONAL LANGUAGE MODULE 11
QOEB12	BIDIRECTIONAL LANGUAGE MODULE 12
QOEB13	BIDIRECTIONAL LANGUAGE MODULE 13
QOEB14	BIDIRECTIONAL LANGUAGE MODULE 14
QOEB15	BIDIRECTIONAL LANGUAGE MODULE 15
QOEB16	BIDIRECTIONAL LANGUAGE MODULE 16
QOECHECK	CHECK IF USER ENROLLED IN OFFICE
QOECMCRT	COMMAND PROCESSOR FOR CRTDOC COMMAND
QOECMDSF	COMMAND PROCESSOR FOR DSPFLR COMMAND
QOECMDSP	COMMAND PROCESSOR FOR DSPDOC COMMAND
QOECMEDT	COMMAND PROCESSOR FOR EDTDOC COMMAND
QOECMHLP	COMMAND PROCESSOR FOR DSPHLPDOC COMMAND
QOECMPRQ	COMMAND PROCESSOR FOR DSPDOCPRTQ COMMAND
QOECMPRT	COMMAND PROCESSOR FOR PRTDOC COMMAND
QOECMWKF	COMMAND PROCESSOR FOR WRKFLR COMMAND
QOECMWRK	COMMAND PROCESSOR FOR WRKDOC COMMAND
QOEDCTCR	CREATE SPELL AID DICTIONARY
QOEDD	CREATE/DESCRIBE DOCUMENTS
QOEDE	DOCUMENT REQUEST EXECUTION
QOEDH	DOCUMENT HANDLER MODULE
QOEDL	SELECT DOCUMENT
QOEDP	PRINT DOCUMENT LIST
QOEDW	WORK WITH DOCUMENTS
QOED2	DEEDIT SUBROUTINE
QOEEXIT	DW INVOCATION EXIT ROUTINE
QOEFFV	FORM FIELD EDITING/VALIDATION
QOEGD	VIEW OR PRINT GRAPHIC
QOEGO	GO TO ANOTHER LIST MENU
QOEGP	PRINT GRAPHIC OPTIONS
QOEHP	HELP INTERFACE
QOEHPEX	ONLINE BROWSE EXIT ROUTINE
QOEIEXIT	EXIT FOR CREATE OF SPELL AID DICTIONARY
QOEIO	INDEX OPTION MODULE
QOELD	CREATE/DESCRIBE FOLDER
QOELL	SELECT TEXT FOLDER DISPLAY
QOELT	FORM FIELD LOCATOR TABLE MANAGER
QOEMD	CREATE DOCUMENT FROM MESSAGE
QOEMN	TEXT FOLDER MAINTENANCE
QOEOL	SELECT NON-TEXT DOCUMENT DATA
QOEOW	WORK WITH OBJECTS MODULE
QOEPOCRT	PROMPT OVERRIDE PROGRAM FOR CRTDOC CMD
QOEPODSP	PROMPT OVERRIDE PROGRAM FOR DSPDOC
QOEPOEDT	PROMPT OVERRIDE PROGRAM FOR EDTDOC
QOEPOPRT	PROMPT OVERRIDE PROGRAM FOR PRTDOC
QOEPOWRK	PROMPT OVERRIDE PROGRAM FOR WRKDOC
QOEPQ	PRINT QUEUE
QOEPRTSW	PRINT STOP WORD LIST
QOERA	REVISE SUPPLEMENTAL DICTIONARY DISPLAY
QOERD	RETRIEVE DOCUMENT & CREATE VIRTUAL FILE
QOERT	OFFICE EDITOR ROOT MODULE
QOERTVSW	RETRIEVE STOP WORD LIST
QOERV	DOCUMENT RECOVERY MODULE
QOERZ	QOERT, THE SEQUEL
QOESAVDC	N TO N-1 SAVE *SPADCT OBJECT HANDLER
QOESETEX	QOERA CLEANUP ROUTINE
QOESTUB	STUB MODULE
QOESU	SUSPEND EDIT DISPLAY
QOETWAPI	GET STOP WORD LIST NAME
QOEVLCRT	VALIDITY CHECKER FOR CRTDOC COMMAND
QOEVLDSF	VALIDITY CHECKER FOR DSPFLR
QOEVLDSP	VALIDITY CHECKER FOR DSPDOC & PAGDOC
QOEVLEDT	VALIDITY CHECKER FOR EDT, CRT, DSP, PAG
QOEVLHLP	VALIDITY CHECKER FOR DSPHLPDOC
QOEVLPRT	VALIDITY CHECKER FOR PRTDOC
QOEVLWKF	VALIDITY CHECKER FOR WRKFLR COMMAND
QOEVLWRK	VALIDITY CHECKER FOR WRKDOC COMMAND
QOEXITPQ	CLOSE FILE ON ABNORMAL EXIT
QOFCHAUT	CHECK FOR ROOT FOLDER CREATE AUTHORITY
QOFDWMN	MAIN MODULE FOR DW MATCHER
QOFDWXFM	DOCUMENT XFORM MODULE FOR DW MATCHER
QOFFMS	RSTS36FLR - FMS INTERFACE MODULE
QOFIDP	IDP MODULE FOR DW MATCHER
QOFOPDKT	OPEN DISKETTE FILE FOR FOLDER RESTORE
QOFRSTCP	RESTORE S/36 FOLDER CPP
QOFRSTIX	RSTS36FLR IEXIT MODULE
QOFRSTVC	RSTS36FLR VALIDITY CHECKER PROGRAM
QOFRTVEN	RETRIEVE ENROLLMENT INFORMATION
QOFTAPDT	RSTS36FLR - TAPE DATA MODULE
QOFTPHDR	WRITE TAPE LABEL INFO TO FILES
QOFVALDV	FOLDER RESTORE DEVICE VALIDATAION
QOGCHGOE	API CHANGE OFFICE EXIT PROGRAMS
QOGCSHCL	INITIALIZE O1 CACHE STRUCTURE
QOGCSHIN	INITIALIZE O1 CACHE STRUCTURE
QOGRTVOE	QOGRTVOE HEADER IN ILE/COBOL
QOGRTVOE	QOGRTVOE API HEADER FOR CBL
QOGRTVOE	RETRIEVE OFFICE EXIT PROGRAMS
QOGRTVOE	QOGRTVOE API HEADER IN RPG
QOGRTVOE	QOGRTVOE HEADER IN ILE/RPG
QOHACK	MAIL SERVICE ACKNOWLEDGE ROUTINE
QOHACKRY	ACKNOWLEDGE I-EXIT PROCESSOR
QOHBLDDP	DISTRIBUTION SUBPROFILE BUILD
QOHCHGA	DIA API CHANGE DISTRIBUTION ATTRIBUTES
QOHFDRCV	FILE-DELIVERY RECOVERY MODULE
QOHFILDV	THIS IS STUB MODULE FOR EPT BUILD
QOHFIXIX	FIX DRX
QOHFIXQ	LIST DIA CPP
QOHFIXXX	IEXIT PROGRAM FOR QOHFIXIX
QOHGETDP	DISTRIBUTION SUBPROFILE GET
QOHICHG$	VALIDITY CHECKER FOR CHGDSTD
QOHICHGD	CHANGE DISTRIBUTION DESCRIPTION
QOHICHGV	VALIDITY CHECKER FOR CHGDSTD
QOHIOUTF	OH CREATE/UPDATE OUTFILE
QOHJBCNL	EVENT HANDLER FOR QDIAHSTPRT CNL W/ CTL
QOHLSTIB	LIST DIA CPP
QOHMAILP	THIS IS STUB MODULE FOR EPT BUILD
QOHMISC	MAIL SERVICES MISCELLANEOUS
QOHMLPRT	CMD PROCESSOR MAIL SERVICES HOST PRINT
QOHMLRCV	RECOVER MODULE - MAIL PRINT
QOHPRTCM	COMMON MODULE TO BUILD COVER PAGE
QOHRCVIX	RECOVER DRXS
QOHRNUSR	MAIL SERVICES SUPPORT FOR RNMDIRE
QOHRTVA	CPP FOR QOHCHGA CMD
QOHSTSL	STATUS LIST
QOHUPDDP	DISTRIBUTION SUBPROFILE UPDATE
QOHUPDEL	UPDATE ATTRIBUTES OF IN-MAIL-LOG ITEM
QOHUPRCV	DIA UPDATE-DEL INVOCATION EXIT
QOHZMAIL	LIST DIA CPP

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QOJRSTCP  RESTORE DLO COMMAND PROCESSOR
QOJRSTDL  RESTORE DLO OBJECT HANDLER
QOJRSTIX  RSTDLO INVOCATION EXIT
QOJRSTML  RESTORE MAIL CPP
QOJRSTVC  RSTDLO COMMAND VALIDITY CHECK PROGRAM
QOJSRIXT  SAV/RSTLO INVOC EXIT FOR CALLED MODULES
QOJSVCPR  SAVDLO COMMAND PROCESSOR
QOJSVCP2  SAVDLO MAINLINE CODE
QOJSVVCP  SAVDLO COMMAND VALIDITY CHECK PROGRAM
QOKAPOP   PROMPT OVERRIDE PGM FOR CHGDIRA CL CMD
QOKATTCP  CHANGE DIRECTORY ATTRIBUTES
QOKCALCD  DELETE, ADD AND PRINT COLLECTOR SYSTEMS
QOKCALDD  CALL DEPARTMENT DETAILS PROGRAM
QOKCALLD  CALL LOCATION DETAILS PROGRAM
QOKCALND  CALL NICKNAME DETAILS PROGRAM
QOKCALSD  DELETE, PRINT OR DISPLAY OF SHADOW SYSTE
QOKCAPPC  APPC FUNCTIONS FOR SHADOWING
QOKCCTL   SHADOW CONTROLLER FOR DIRECTORY
QOKCCTOR  COLLECT SHADOW DATA
QOKCHEAB  CHANGE THE EABID AND PROPAGATE CHANGES
QOKCHGDL  CHANGE/RENAME DIST LIST FOR CL CMDS
QOKCHIPE  CHANGE IPE - DIR ATTRIBUTES IN QDOC
QOKCHKOR  CHECK O/R NAME FIELDS
QOKCNEXT  NEXT SHADOW DETERMINATION
QOKCNFRM  CONFIRM EXISTENCE USER EXIT PROGRAM
QOKCPYCP  CPYFRMDIR/CPYTODIR CPP
QOKCQDOC  CHECK QDOC USER PROFILE AFTER RESTORE
QOKCSUP   DIRECTORY SHADOW SUPPLIER
QOKCVTDT  CONVERT DATE/TIME FORMATS
QOKDIRVC  VALIDITY CHECKER FOR DIR CL COMMANDS
QOKDLPOP  PROMPT OVERRIDE PROGRAM FOR CHG/RNMDSTL
QOKDPTUP  UPDATE DEPARTMENTS
QOKDRX    AUTO CREATE DRX
QOKDSPDP  DISPLAY DIR PNL - CHANGE DIR ENTRY
QOKDSPDP  QOKDSPDP HEADER IN ILE/COBOL
QOKDSPDP  QOKDSPDP API HEADER FOR CBL
QOKDSPDP  QOKDSPDP API HEADER IN RPG
QOKDSPDP  QOKDSPDP HEADER IN ILE/RPG
QOKDSPX4  DISPLAY/ADD O/R ADDRESS ENTRY
QOKFUTDT  CALCULATE PAST/FUTURE SHADOW DATE
QOKGETD   GET DIRECTORY DETAILS
QOKLOCCP  CPP FOR WRKDIRLOC CL COMMAND
QOKLOCUP  UPDATE LOCATIONS FILES
QOKMOD    RENAME DIRECTORY ENTRY ROUTER MODULE
QOKNCKCP  CMD PROCESSING PROGRAM FOR NNAM CMDS
QOKNNDTL  NICKNAME DETAILS-PRINT AND DISPLAY
QOKNNPOP  PROMPT OVERRIDE PROGRAM FOR NNAM CMDS
QOKPADOR  ADD O/R NAME
QOKPALOC  ADD AND CHANGE DIRECTORY LOCATION
QOKPCLOC  COMBINE DIRECTORY LOCATIONS
QOKPCWRK  WORK WITH SHADOWING COLLECTORS
QOKPDLOC  DELETE AND DISPLAY DIRECTORY LOCATION
QOKPDSOR  DISPLAY O/R NAME
QOKPLCHG  CHANGE/RENAME DIST LIST PANEL PROGRAM
QOKPNADD  ADD NICKNAME
QOKPNCHG  CHANGE DIRECTORY NICKNAMES
QOKPNWRK  WORK WITH NICKNAMES
QOKPOP    PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKPPLOC  POSITION TO FOR LOCATIONS
QOKPSLOC  SELECT DIRECTORY LOCATIONS
QOKPSPOS  SHADOW SYSTEM POSITION LIST GENERAL EXIT
QOKPSRCH  SYSTEM DIRECTORY SEARCH CONTROL PROGRAM
QOKPSTCH  POST CHANGE LOGS FOR SHADOWING
QOKPSWRK  PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKPTADD  PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKPTADM  PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKPTCHG  PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKPTDTL  PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKPTLST  PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKPTMWK  WORK WITH DEPT MEMBERS PROGRAM
QOKPTWRK  WORK WITH DEPARTMENTS
QOKPUDF   USER DEFINED FIELDS PANEL MODULE
QOKPWLOC  WORK WITH DIRECTORY LOCATIONS
QOKRNIPL  ISSUE RENAMES WHILE IPLING MODULE
QOKRNMCP  RENAME DIRECTORY ENTRY CPP
QOKRNMPL  RENAME DIRECTORY ENTRY PANEL MODULE
QOKRNPOP  RNMDIRE PROMPT OVERRIDE PROGRAM
QOKRNUSR  RENAME DIRECTORY ENTRY MODULE
QOKRTVOR  RETRIEVE O/R NAME
QOKRTVRT  RETRIEVE DIRECTORY ENTRY SYS NAME/GROUP
QOKSADDT  ADD-TO-LIST DIRECTORY SEARCH EXIT
QOKSCHD   QOKSCHD HEADER IN ILE/COBOL
QOKSCHD   QOKSCHD API HEADER FOR CBL
QOKSCHD   SEARCH DIRECTORY API
QOKSCHD   QOKSCHD API HEADER IN RPG
QOKSCHD   QOKSCHD HEADER IN ILE/RPG
QOKSCOND  PROMPTER EXIT PROGRAM FOR KWD FRQ
QOKSHDCP  PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKSHDIN  INITIALIZE SHADOWING TABLES
QOKSHPOP  PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKSHRMV  PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKSHUPD  PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKSJBCP  STRDIRSHD AND ENDDIRSHD COMMAND CPP
QOKTADDT  DS - ADD TO LIST DEPT/MBR EXIT
QOKTMBRO  DEPARTMENT MEMBER OPTIONS PROCESSING
QOKTPOST  DS - POSITION LIST GENERAL EXIT
QOKWSHCP  PROMPT OVERRIDE PROGRAM FOR DIR CL
QOKXITCK  DIRECTORY ENTRY USER EXIT INTERFACE
QOKXLATE  TRANSLATE NAME/DEPT FIELD
QOKXTRNS  TRANSLATE FIELD PROGRAM
QOLCLNUP  OPEN FM SET FILTERS MODULE
QOLCONIN  OPEN FM WRKJOB CONNECTION INFO MODULE
QOLDLINK  OPEN FM RECEIVE MODULE
QOLELINK  OPEN FM RECEIVE MODULE
QOLERP    OPEN FM WRKJOB CONNECTION INFO MODULE
QOLEVHLR  OPEN FM WRKJOB CONNECTION INFO MODULE
QOLLSTEN  OPEN FM WRKJOB CONNECTION INFO MODULE
QOLQLIND  OPEN FM WRKJOB CONNECTION INFO MODULE
QOLQLIND  QOLQLIND HEADER IN ILE/COBOL
QOLQLIND  QOLQLIND API HEADER FOR CBL
QOLQLIND  QOLQLIND API HEADER IN RPG
QOLQLIND  QOLQLIND HEADER IN ILE/RPG
QOLRECV   OPEN FM WRKJOB CONNECTION INFO MODULE
QOLRECV   QOLRECV  HEADER IN ILE/COBOL
QOLRECV   QOLRECV  API HEADER FOR CBL
QOLRECV   QOLRECV  API HEADER IN RPG
QOLRECV   QOLRECV  HEADER IN ILE/RPG
QOLSEND   OPEN FM WRKJOB CONNECTION INFO MODULE
QOLSEND   QOLSEND  HEADER IN ILE/COBOL
QOLSEND   QOLSEND  API HEADER FOR CBL
QOLSEND   QOLSEND  API HEADER IN RPG
QOLSEND   QOLSEND  HEADER IN ILE/RPG
QOLSENDM  OPEN FM WRKJOB CONNECTION INFO MODULE
QOLSETF   OPEN FM WRKJOB CONNECTION INFO MODULE
QOLSETF   QOLSETF  HEADER IN ILE/COBOL
QOLSETF   QOLSETF  API HEADER FOR CBL
QOLSETF   QOLSETF  API HEADER IN RPG
QOLSETF   QOLSETF  HEADER IN ILE/RPG
QOLTIMER  OPEN FM WRKJOB CONNECTION INFO MODULE
QOLTMREH  OPEN FM WRKJOB CONNECTION INFO MODULE
QOLTRACE  OPEN FM WRKJOB CONNECTION INFO MODULE
QONACFG   OPEN FM SET FILTERS MODULE
QONDSCNN  OPEN FM SET FILTERS MODULE
QONVERFY  OPEN FM SET FILTERS MODULE
QONVRYON  OPEN FM SET FILTERS MODULE
QONVRYSA  OPEN FM SET FILTERS MODULE
QONX4REC  OPEN FM SET FILTERS MODULE
QONX4RIX  OPEN FM SET FILTERS MODULE
QOPADJ    LINE ADJUST FOR DW/SL
QOPAI     FORMAT INDEX PAGES
QOPAL     ALLOCATE UFCBS FOR PRINTERS/FILES
QOPAT     COPY PAGE/LINE FORMATS
QOPBL     BELGUIM COLLATING SEQUENCE
QOPCA     CANADA COLLATING SEQUENCE
QOPCHKFN  FOOTNOTE INSTRUCTION VALIDITY CHECKER
QOPCP     PRINT COVER PAGE
QOPDL     DEALLOCATE DTFS FOR PRINTERS/FILES
QOPDN     DENMARK COLLATING SEQUENCE
QOPED     EDITING FOR DATA MERGE/SUMMARY MATH
QOPEF     EXIT FORM DOCUMENT DISPLAY
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QOPER	OPEN RESOLVED DOCUMENT
QOPEX	EXIT A DOCUMENT DISPLAY
QOPFP	FINAL PROCESSING
QOPFR	FRANCE COLLATING SEQUENCE
QOPFTGFT	GENERATED FORMATTED TEXT FOR FOOTNOTES
QOPFTGI	PRINT
QOPFTR	FOOTNOTE TEXT RESOLVER
QOPFTSP	FOOTNOTE TEXT SPACE CALCULATOR
QOPGB	UNITED KINGDOM COLLATING SEQUENCE
QOPGE	GERMANY COLLATING SEQUENCE
QOPGK	GREEK COLLATING SEQUENCE
QOPGU	PORTUGAL COLLATING SEQUENCE
QOPHB	HEBREW COLLATING SEQUENCE
QOPHF	ADD HEADERS AND FOOTERS
QOPHH	HELP AND HEADER TABLES
QOPIE	ICELANDIC COLLATING SEQUENCE
QOPIF	INCLUDE FORMAT CHANGES
QOPIN	INCLUDE PROCESSING
QOPIT	ITALY COLLATING SEQUENCE
QOPIX	INCLUDE AND TRANSFORMATION
QOPLO	LABEL OPTIONS
QOPLP	LABEL PRINTING
QOPMCT	PRINTABLE MULTI-COLUMN TEXT
QOPMCV	MULTI-COLUMN TEXT VIEW
QOPMD	MERGE FROM A DOCUMENT
QOPMG	MERGE FUNCTION
QOPMO	DW MERGE OPTIONS DISPLAY
QOPMP	MERGE INITIALIZATION FUNCTION
QOPMRGNM	MERGE DATA OPTIONS DISPLAY
QOPNH	NETHERLANDS COLLATING SEQUENCE
QOPNO	NORWEGIAN COLLATING SEQUENCE
QOPOH	HANDLE OUTLINE HEADING MARKUP
QOPPC	PC ORGANIZER SUPPORT
QOPPG	DW/36 SAVE OPTIONS MODULE
QOPPL	PRINT RESOLUTION
QOPPM	PRINT MAINLINE MODULE
QOPPO	PRINT OPTIONS DISPLAYS 1-3
QOPPP	OUTPUT PAGINATION
QOPPQ	DATA/TEXT MERGE FUNCTIONS
QOPPR	PRINT INSTRUCTION RESOLUTION
QOPPW	WIDOW LINE PROCESSING FOR OUTPUT
QOPRE	REMOVE SPELLING ERRORS
QOPRO	DW RESOLVED PRINT OPTIONS DISPLAY
QOPRUN	RUN INSTRUCTION
QOPSD	SWEDEN COLLATING SEQUENCE
QOPSF	SWEDISH/FINNISH COLLATING SEQUENCE
QOPSM	SUMMARY MATH
QOPSN	SPAIN COLLATING SEQUENCE
QOPSORT	SORT TEXT LINES
QOPSP	SOURCE PAGINATION
QOPSQ	READ COLLATING TABLE
QOPSW	SWISS COLLATING SEQUENCE
QOPTB	RESOLVE TABS FOR DATA/TEXT AND MATH
QOPTC	CREATE TABLE OF CONTENTS
QOPTK	TURKEY COLLATING SEQUENCE TABLES
QOPTU	PARSE INSTRUCTIONS
QOPWS	WIDOW LINES FOR SOURCE PAGINATE
QOPXF	TRANSFORMATIONS INTERFACE MODULE
QOQCTL	SESSION SERVICES CONTROLLER
QOQGETAU	GET ACTIVE USER TABLE ENTRY
QOQINIT	GLOBAL INIT COMMAND CPP
QOQPRAS2	PARSING TABLE FOR DIA VERSION 2 COMMANDS
QOQSESRV	TPN FOR RELEASE 20 OFFICE
QOQTERM	GLOBAL INIT COMMAND CPP
QOSADACP	ADD ACCESS CODE CL CPP
QOSADD	DIA V2 ADD CPP
QOSADDLE	ADD DISTRIBUTION LIST ENTRY FUNCTION
QOSADDSC	ADD DIRECTORY DESCRIPTION FUNCTION
QOSADDTO	DS - ADD TO LIST GENERAL EXIT
QOSADUSR	ADD DIRECTORY ENTRY FUNCTION
QOSAPIVC	API VALIDITY CHECKER
QOSAPPC	TPN FOR RELEASE 10 DIA
QOSASYCP	ADDDLOAUT,CHGDLOAUT,RMVDLOAUT CPP
QOSASYNC	QOSASYNC - DIA OFFICE SYSTEMS
QOSAUDVC	DSPDLOAUD AND CHGDLOAUD VALIDTY CHECKER
QOSCALDD	CALL DISPLAY DIRECTORY DETAILS PROGRAM
QOSCANL2	QOSCANL2 - DIA OFFICE SYSTEMS
QOSCHAUD	CHGDLOAUD CPP
QOSCHGCP	CHANGE DOCUMENT OWNER CL CPP
QOSCHGSY	QOSCHGSY
QOSCHKAF	SIGN ON/AFFINITY PROCESSOR
QOSCHUSR	CHANGE DIRECTORY ENTRY FUNCTION
QOSCKDLT	CHECK-DELETE DTOS AND DOCUMENTS
QOSCKRCV	CHECK DELETE RECOVERY ROUTINE
QOSCKRQS	QOSCKRQS - DIA OFFICE SYSTEMS
QOSCLAUT	DISPLAY DLO AUTHORITIES/ACCESS CODES
QOSCLRRQ	CLEAR RECIPIENT QUEUE
QOSCNLDS	CANCEL
QOSCNRCV	CANCEL RECOVERY
QOSCOPY	DIA V2 COPY COMMAND PROCESSOR
QOSCPGCP	CHANGE DLO PRIMARY GROUP CPP
QOSCPRCV	DIA COPY RECOVERY PROGRAM
QOSCRTDL	CREATE DISTRIBUTION LIST FUNCTION
QOSCRTRQ	CREATE RECIPIENT QUEUE
QOSCTDDD	QOSCTDDD - BUILD DOCUMENT DESCRIPTORS
QOSCTDOC	QOSCTDOC
QOSCTRLR	DIA SESSION STATE CONTROLLER
QOSCVTEA	CONVERT EXTENDED ATTRIBUTES
QOSCVTSC	QOSCVTSC - CONVERT SEARCH CRITERIA
QOSDAACP	DISPLAY ACCESS CODE AUTHORITY CPP
QOSDACP	DISPLAY/PRINT DLO AUTHORITIES CPP
QOSDALO	DISPLAY AUTHORIZATION LIST DLO CPP
QOSDATCP	DISPLAY ACCESS CODES CPP
QOSDDACP	DISPLAY USER PERMISSION CPP
QOSDELET	DELETE DIA CPP
QOSDIATP	DIA TRANSACTION PGM FOR SNADS
QOSDIEXT	WRKDIR/WRKDSTL INVOCATION EXIT
QOSDIRCP	DIRECTORY API COMMANDS CPP
QOSDIRF4	CALL F4 LIST PROCESSING
QOSDIRPT	DIRECTORY/DIST LIST PRINT/OUTFILE
QOSDLAUT	DISPLAY/VIEW DLO AUTHORITIES
QOSDLCP	DISTRIBUTION LIST API COMMANDS CPP
QOSDLDCP	DELETE DOCUMENT CL CPP
QOSDLLCP	DELETE DOCUMENT LIST CL CPP
QOSDLTDL	DELETE DISTRIBUTION LIST FUNCTION
QOSDLUSR	DELETE USER FROM DIRECTORY
QOSDSAUD	DSPDLOAUD CPP
QOSDSPCP	CPP FOR DSPDIR AND DSPDSTL CL COMMANDS
QOSDSPPR	DISPLAY DLO AUTHORITIES/ACCESS CODES
QOSDSRCV	QOSDSTRB INVOCATION EXIT
QOSDSTRB	GENERALIZED DISTRIBUTION
QOSEARCH	QOSEARCH
QOSEXEC	QOSEXEC
QOSEXRCV	QOSEXRCV
QOSFBKOT	QOSFBKOT
QOSFILE	QOSFILE
QOSFILE2	QOSFILE2 - DIA VERSION 2 FILE
QOSGAACP	GRANT ACCESS CODE AUTH CL CPP
QOSGDACP	GRANT DOC AUTHORITY CL CPP
QOSGETDP	GET DOCUMENT DESCRIPTORS
QOSGETEA	GET EXTENDED ATTRIBUTES QOSGETEA
QOSHNAUT	LOG DOCUMENT/FOLDER SECURITY ERRORS
QOSIAPIX	DIAAPI INVOCATION EXIT PROGRAM
QOSICHGD	DIA API CL CMD - CHANGE DOCUMENT DESC
QOSICNLD	DIA API CANCEL DISTRIBUTION
QOSIDPUP	QOSIDPUP
QOSIEXIT	QOSIEXIT MODULE
QOSIFILD	FILE DOCUMENT
QOSIFLSV	SNADS FILE SERVER INCOMING DIST
QOSIFSPC	CREATE TEMPORARY FILE SPACE
QOSIGNON	SIGN ON DIA CPP
QOSINIT	TRUE DIA SESSION INITIALIZATION
QOSINIT2	INIT PROCESSING FOR DIR AND DSTL WORK
QOSIOUTF	OS CREATE/UPDATE OUTFILE
QOSIPLR	DIA IPL RECOVERY ROUTINE
QOSIQDOC	DIA API CL COMMAND - QUERY DOC LIBRARY
QOSIQRYD	DIA API QUERY DISTRIBUTION
QOSIRCVD	DIA API RECEIVE DISTRIBUTION
QOSIRPLD	DIA API CL COMMAND - REPLACE DOCUMENT
QOSIRTVD	DIA API QUERY DISTRIBUTION

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QOSISNDD  SEND DISTRIBUTION
QOSISNDV  VALIDITY CHECKING PGM FOR SNDDST CMD
QOSISNVU  SIGN ON AND VERIFY USER
QOSLFLSV  SNADS FILER SERVER LOCK/RELEASE
QOSLIBCK  CHECK EXISTENCE/TYPE OF DIA LIB
QOSLIST   LIST DIA CPP
QOSLSTAT  LIST PROCESSOR CPP
QOSLSTIX  LIST DIA CPP
QOSLSTPT  LIST DIA CPP
QOSLSTUF  LIST DIA CPP
QOSMAINT  QOSMAINT
QOSMDISP  FILE & REQ DIST MACRO PROCESSOR
QOSMLFMT  INDIRECT USER
QOSMLIST  LIST DIA CPP
QOSMMIDP  OSRPLIDP, QOPUTIDP, OSUPDIDP MACRO PROCE
QOSMODF2  DIA V2 MODIFY COMMAND
QOSMODIF  QOSMODIF
QOSMOVE   DIA V2 MOVE COMMAND
QOSMRECV  CANCEL MACRO PROCESSOR
QOSMREM   RETRIEVE/DELETE/EXECUTE MACRO PROCESSR
QOSMSCTL  SIGN ON & SIGN OFF MACRO PROCESSOR
QOSMSRCH  QOSMSRCH
QOSOBRCV  QOSOBTAN INVOCATION EXIT
QOSOBTAN  DIA OBTAIN DISTRIBUTION
QOSOFLSV  SNADS FILE SERVER OUTGOING DIST
QOSOPEN   OPEN OS DATA BASE FILE
QOSOSCB   QDLS OSSCB MODULE
QOSOXIT   OFFICE USER EXIT COMMAND PROCESSOR
QOSPADDE  DS - ADD NEW DIRECTORY ENTRY
QOSPADID  DS - ASSIGN DIFFERENT ID TO DESCRIPTIO
QOSPADLE  DS - ADD DISTRIBUTION LIST ENTRIES
QOSPADND  DS - ADD NEW DESCRIPTION
QOSPARSE  DIA AND SNADS DIU PARSE
QOSPBCTL  DIA PROCESS B SESSION CONTROLLER
QOSPCHGD  DS - CHANGE YOUR DIRECTORY ENTRY DETAI
QOSPCHGL  CHANGE DIST LIST ENTRIES PANEL PGM
QOSPCRTL  CREATE NEW DIST LIST PANEL PROGRAM
QOSPCYDE  DS - CHANGE YOUR DIRECTORY DETAILS
QOSPDELD  DS - DIRECTORY ENTRY DELETE CONFIRM
QOSPDELL  DS - DISTRIBUTION LIST DELETE CONFI
QOSPDSPD  DISPLAY DIRECTORY DETAILS PANEL PROCESSG
QOSPLEDC  DS - LIST ENTRY DELETE CONFIRMATION
QOSPRASP  QOSPRASP
QOSPRINT  QOSPRINT
QOSPRSMD  DIA V2 COMMON PARSE CODE MODIFY DATA
QOSPSPRF  DS - SELECT USER PROFILE
QOSPSSYS  DS - SELECT SYSTEM NAME/GROUP
QOSPUTEA  PUT EXTENDED ATTRIBUTES QOSPUTEA
QOSPWRKD  DS - WORK WITH DIRECTORY
QOSPWRKL  WORK WITH DISTRIBUTION LISTS
QOSRAACP  REVOKE ACCESS CODE AUTH CL CPP
QOSRCRCV  RECEIVE DIST VIA SNADS RECOVERY RTN
QOSRCVDC  RECEIVE DOCUMENTS FROM SNADS NETWORK
QOSRCVEA  RECOVERY MODULE FOR QOSUPDEA
QOSRCVIX  RECOVER RECIPIENT INDEX IEXIT
QOSRCVRQ  DRX RECOVERY
QOSRCVST  RECEIVE STATUS FROM SNADS NETWORK
QOSRDACP  REVOKE DOC AUTHORITY CL CPP
QOSRDIU   BUILD DIUS FOR REMOTE DLS REQUESTS
QOSRDLS   REMOTE DOCUMENT LIBRARY SERVICES
QOSRDRCV  QOSREQDS INVOCATION EXIT
QOSREASD  REASSIGN USER ID TO NEW DESCRIPTION
QOSREMOV  QOSREMOV DIA REMOVE COMMAND
QOSREQDS  DIA REQUEST DISTRIBUTE
QOSRETRV  RETRIEVE DIA CPP
QOSRETV2  DIA V2 RETRIEVE COMMAND
QOSRFLIX  FILE SERVER RECOVERY INVOCATION EXIT
QOSRFLSV  RECLAIM STORAGE ROUTINE
QOSRMACP  REMOVE ACCESS CODE CL CPP
QOSRMDLE  REMOVE DISTRIBUTION LIST ENTRY FUNCTION
QOSRMIEX  REMOVE ACCESS CODE RECOVERY ROUTINE
QOSRMTAT  REMOTE AUTHORITY CPP
QOSRNUSR  RNMDIRE OS SUPPORT
QOSRTRCV  RETRIEVE RECOVERY ROUTINE
QOSSBKOT  QOSSBKOT
QOSSBMTR  SUBMIT DIA TRANSACTION PGM TO SNADS
QOSSETCV  SET CONTROL VALUE DIA CPP
QOSSIIO   APPC - DIA I/O MANAGER
QOSSRCH2  DIA V2 SEARCH COMMAND
QOSSRLDD  QOSSRLDD
QOSSYEXT  QOSSYEXT
QOSTLMIT  SEARCH TIME LIMIT EVENT HANDLER
QOSTOPOS  DS - POSITION LIST GENERAL EXIT
QOSTRAL2  QOSTRAL2 - DIA OFFICE SYSTEMS
QOSUADDT  ADD TO PGM FOR QOSUCHK2 - ADD OFC USERS
QOSUCHK1  DIRECTORY/DIST LIST LIST DISPLAY
QOSUCHK2  OFFICE/AFFINITY LIST DISPLAY
QOSUPDEA  UPDATE EXTENDED ATTRIBUTES QOSUPDEA
QOSUPOST  POSITION TO GENERAL EXIT FOR QOSUCHK2
QOSVFUSR  VERIFY USER ENROLLED IN DIA
QOSVLCK1  QOSVLCK1 VALIDITY CHECKING PROGRAM
QOSWLOPT  CALL DISPLAY LIST ENTRIES PROGRAM
QOSWRKCP  CPP FOR WRKDIR AND WRKDSTL CL COMMANDS
QOTAHEAD  TEXT/38 TRANSFORM HEADER/FOOTER
QOTAR     TEXT/38 TO DW/SL TRANSFORM ROOT MODULE
QOTASRCD  TMS/38 TO TI TRANSFORM SOURCE DOCUMENTS
QOTATRCD  TMS/38 TO TI TRANSFORM TRAILER RECORDS
QOTATXTD  TMS/38 TO DW/3X TEXT MODULE
QOTDCCVN  OT USER EXIT INTERFACE
QOTDW     DW/36 TO DW/XX TRANSFORM
QOTEP     TI TO IPDS LARGE PRINT TRANSFORM
QOTFD     DOCUMENT TO FILE INIT AND DESCRIPTION
QOTFR     DOCUMENT TO FILE ROOT MODULE
QOTGR     S/XX SOURCE FILE TO DW/XX TRANSFORM
QOTIGRFI  QOTIGRPH - IPDS GRAPHICS MODULE
QOTIGRPH  VERIFY/TRANSFORM IMAGES AND GRAPHS
QOTIM     L2 (FFT) TO DW/XX TRANSFORM
QOTJM     FFTAS400 TO FFTDCA TRANSFORM
QOTKB     L3 INWARD - BEGIN LINE FORMAT CHANGE
QOTKC     L3 INWARD - COMPARE P/L FORMATS
QOTKD     L3 INWARD - DRIVER
QOTKF     L3 INWARD - FORMAT CHANGE
QOTKM     L3 INWARD - MARGIN TEXT
QOTKR     L3 INWARD - ROOT AND DOCUMENT PARAMETERS
QOTKS     L3 INWARD - MASTER FORMAT
QOTKT     L3 INWARD - TEXT AND SINGLE BYTES
QOTKU     L3 INWARD - MULTIBYTES
QOTLF     RFTDCA OUTWARD FORMAT CHANGE HANDLER
QOTLP     RFTDCA OUTWARD PAGE BREAK HANDLER
QOTLR     RFTDCA OUTWARD TRANSFORM ROOT MODULE
QOTLS     RFTDCA OUTWARD MARGIN TEXT HANDLER
QOTMR     1403 (PROFS) TO DW/XX TRANSFORM
QOTND     FFTAS400 TO 1403W6/PROFS TRANSFORM
QOTOG     COPY GRAPH DATA
QOTOI     COPY IMAGE DATA
QOTOP     L3 INWARD - ROOT AND DOCUMENT PARAMETERS
QOTPCGET  PC FILE TO TEXT INTERNAL (GET)
QOTRI     OFFICE TRANSFORMS INVOCATION EXIT
QOTRT     ROOT MODULE FOR OFFICE TRANSFORMS
QOTSCS    TI TO SCS TRANSFORM
QOTXE     TRANSFORMS ERROR LOGGER
QPAEND    END PASSTHRU CPP
QPAGJIEH  GAIJI TABLE UPDATE EVENT HANDLER
QPAITERM  INVOCATION TERMINATION
QPAPASI   INTERMEDIATE SYSTEM INITIATOR
QPAPASS   BEGIN PASSTHRU CPP
QPAPAST2  TARGET TRANSACTION PROGRAM
QPAPCEH   PROCESS CONTROL EVENT HANDLER
QPASYSRQ  PASSTHRU SYS/REQ HANDLER
QPDAIXIT  PD WRKPRB API IEXIT PGM
QPDAPIL   LOG ERROR IN PROBLEM LOG WHEN API INVOKE
QPDAUTPR  AUTO-PAR EVENT HANDLER PROGRAM
QPDAUTP2  AUTO-PAR PROGRAM #2 <SUBMITTED>
QPDCALLS  INTERFACE TO VMC SERVICE FUNCTIONS
QPDCRTDP  XPF CREATE FIRST CALL DATA PACKET
QPDDCTL   XPF DETECT LOOP IN PROBLEM LOG ENTRIES
QPDDLTDP  XPF DELETE FIRST CALL DATA PACKET
QPDDRMTI  DISPLAY REMOTE SYSTEM INFO PANEL
QPDDSP    DISPLAY PANEL MODULE
QPDELOG   INTERFACE TO VMC ERROR LOG
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QPDFRUDP PD DISPLAY FRUS
QPDGCNFG GET CONFIGURATION INFORMATION
QPDHELP HELP PANEL DISPLAY MODULE
QPDHERR XPF DETECTED HARDWARE PROBLEMS MAIN PART
QPDIEXIT PAR INVOCATION EXIT
QPDLOGC MAP FFDC CUE MACRO TO QPDLOGER API
QPDLOGER API TO FIRST FAILURE DATA CAPTURE
QPDMIR INTERFACE TO VMC SERVICE FUNCTIONS
QPDPAALO PAALOC PROCESSING MODULE
QPDPACDI PACDIAG PROCESSING MODULE
QPDPACON PACONVRT PROCESSING MODULE
QPDPACPG PACPGM PROCESSING MODULE
QPDPADEA PADEALOC PROCESSING MODULE
QPDPADSP PADSPMSG PROCESSING MODULE
QPDPADUT PADUTIL PROCESSING MODULE
QPDPAGEL PAGELOG PROCESSING MODULE
QPDPAGRC PAGRCTT PROCESSING MODULE
QPDPAGVS PAGVSTAT PROCESSING MODULE
QPDPAIOP PAIOPRST PROCESSING MODULE
QPDPAMIR PAMIRROR PROCESSING MODULE
QPDPAMOD PAMODIAG PROCESSING MODULE
QPDPARDR PAR DRIVER MODULE
QPDPAVAR PAVARY PROCESSING MODULE
QPDRSLPI RESOLVE PANEL ID TO DSPF, LIB, RECFMT
QPDSERR XPF DETECTED SOFTWARE PROBLEMS MAIN PART
QPDSEXIT SOFTWARE PAR IEXIT MODULE
QPDSRVPG COBOL HEADER FILE FOR FFDC ILE/API
QPDSRVPG RPG HEADER FILE FOR ILE FFDC API
QPDSSG MACHINE DETECTED SYMPTOM STRING
QPDTIMER PD TIMER EVENT HANDLER PROGRAM
QPDUMPER PD DEFAULT SMART DUMPER
QPDWRKPB API TO WORK WITH PROBLEM
QPGMMENU PROGRAMMER MENU
QPIEXITC PERFORMS NUMBERIC CONVERSION FOR DBCS EM
QPIIEXIT QPIIEXIT - 3270 DISPLAY PIPELINE IEXIT
QPIPCCNV PERFORMS 8 TO 7 CONVERSION FOR 5555PC EM
QPIPCEH QPIPCEH - 3270 DISPLAY PIPELINE EVENTS
QPIPIPE QPIPIPE - 3270 DISPLAY PIPELINE SETUP
QPKPSFPT PRINT COMMAND
QPMACLCT PERFORMANCE DATA COLLECTOR
QPMAEVNT PM API EVENT HANDLER
QPMAJOB PROCESS PM API JOBS DATA
QPMASERV PERFORMANCE COLLECTOR SERVER
QPMBCVTD CVTPFRDTA CLP
QPMBDMPT DUMP VMC TRACE PGM
QPMBODBF OPEN DATABASE FILE MEMBER MODULE
QPMBPCS SET PC SUPPORT FLAG
QPMCADD ADD COLLECTION SCHEDULE CPP
QPMCENDP END PERFORMANCE MONITOR CPP
QPMCEPC END PERFORMANCE COLLECTION CPP
QPMCPCPO CHANGE PFR COL PROMPT OVERRIDE
QPMCSPC START PERFORMANCE COLLECTION CPP
QPMCSTAR START PERFORMANCE MONITOR CPP
QPMCWRK WORK COLLECTION SCHEDULE CPP
QPMECOFL PM COUNTER OVERFLOW EVENT HANDLER
QPMEISDN PM ISDN EVENT HANDLER
QPMEPMPO END PERFORMANCE MONITOR PROMPT OVERRIDE
QPMERWS PM REMOTE WS RESPONSE TIME EVENT HANDLER
QPMESTOP STOP PERFORMANCE MONITOR EVENT HANDLER
QPMETIME PERFORMANCE MONITOR TIMER EVENT HANDLER
QPMETRCF TRACE TABLE FULL EVENT HANDLER
QPMHEAP HEAP MANAGER FOR PERF COLLECTOR
QPMIEXIT PERFORMANCE MONITOR INVOCATION EXIT PGM
QPMLCIE PM COLLECTION COMMAND I EXIT
QPMLPFRD LIST PERFORMANCE DATA API
QPMLPFRD QPMLPFRD HEADER IN ILE/COBOL
QPMLPFRD QPMLPFRD API HEADER FOR CBL
QPMLPFRD QPMLPFRD API HEADER IN RPG
QPMLPFRD QPMLPFRD HEADER IN ILE/RPG
QPMLSBM AUTO COLLECTION SUBMIT EVENT HANDLER
QPMLSCD AUTO COLLECTION SCHEDULER
QPMLSIE PM COLLECTION SUBMITER I EXIT
QPMLWAIT AUTO COLLECTION WAIT ROUTINE
QPMMCDEV RETURN COMMUNICATIONS DEVICE INFO
QPMMINIT PERFORMANCE MONITOR INITIALIZATION
QPMMIOBS UPDATE OBSERVATIONS DATA BASE
QPMMJOBC PM JOB COMPLETION EVENT HANDLER
QPMMMAIN PERFORMANCE MONITOR MAIN MODULE
QPMMMRMD RETRIEVE RESOURCE MGMT DATA
QPMMNDCD RETURN LINE AND CU INFO
QPMMRJD RETRIEVE JOB DATA
QPMMRQIO ISSUE RTM REQIO REQUESTS
QPMMRSPT PERFORMANCE MONITOR RESPONSE TIME
QPMMSLTT SELECT INTERNAL OBSERVATIONS
QPMMSOBJ PERF MONITOR SERVER OBJ MODULE
QPMMSTP PERFORMANCE MONITOR STOP REQSO
QPMMSTPM STOP INTERNAL OBSERVATIONS
QPMMSTR PERFORMANCE MONITOR START REQSO SESSEION
QPMMSTRM START INTERNAL OBSERVATIONS
QPMMTSKC PM TASK COMPLETION EVENT HANDLER
QPMMWAIT WAIT FOR STOP PERFORMANCE MONITOR EVENT
QPMWKCOL WORK WITH COLLECTOR API
QPQCARTC PROVIDE ACCESS TO LU4/ARCTIC SERVICES
QPQCCDRV EPT PLACEHOLDER
QPQCCOMM COMMUNICATIONS DRIVER ENTRY MODULE
QPQCICF PROVIDE ACCESS TO APPC SERVICES
QPQCNACK PROCESS DATA STREAM ERRORS
QPQCPINT COMM DRIVER INITIALIZATION
QPQCTDRV EPT PLACEHOLDER
QPQCTRC PSF TRACE ROUTINE
QPQCXDRV EPT PLACEHOLDER
QPQMPSF PRINT SERVICES FACILITY MANAGER PROGRAM
QPQPDMGR PD MANAGER MAIN MODULE
QPQPEXIT PD INVOCATION EXIT/EXCEPTION MONITOR
QPQRMGR RESOURCE MANAGER MAIN MODULE
QPQSASPC LOCATE QPQSFC ASSOCIATED SPACE
QPQSCFIX CFI DATA STREAM INTERFACE
QPQSDOCX CCM DOCUMENT INTERFACE
QPQSFC STRUCTURED FIELD CONVERTER PROGRAM
QPQSMSGX SHELL EXIT ROUTINE FOR CCM MESSAGES
QPQSTRCX CCM SHELL FOR TRACE
QPQXSPG SEPARATOR PAGE GENERATOR MAIN MODULE
QPQYBLPZ CCM BEGIN LINE PAGE
QPQYBPPZ CCM BEGIN PAGE PROCESSING
QPQYDCSZ CCM DOCUMENT START
QPQYEAGZ CCM END ACTIVE ENVIRONMENT GROUP
QPQYELPZ CCM END LINE PAGE PROCESSING
QPQYEPPZ CCM END PAGE PROCESSING
QPQYFDPZ CCM KERNEL FORMDEF PROCESSING
QPQYIFMT FONT MAPPING TABLE INITIALIZATION
QPQYIFM2 FONT MAPPING TABLE INITIALIZATION
QPQYIFM3 FONT MAPPING TABLE INITIALIZATION
QPQYINVZ CCM HANDLE INVOKE STRUCTURED FIELDS
QPQYOCAZ CCM KERNEL OCA OBJECT PROCESSING
QPQYPDPZ CCM KERNEL PAGEDEF PROCESSING
QPQYPOSZ CCM STATE MACHINE PROGRAM
QPQYSTMZ CCM STATE MACHINE PROGRAM
QPRCRASH PRM INTERNAL ERROR DETECTION
QPRCRTPG CREATE USER PROGRAM
QPRISTCK PRM CHECK INTERNAL SYMBOL TABLE
QPRISTSM PRM OBJECT SUMMARY LIST
QPRLIST PRM INTERFACE TO PUT MACRO
QPRMICK PRM INSTRUCTION STREAM SEMANTIC CHECK
QPRMICK1 QPRMICK1 STUB FOR EPT BUILD
QPRODTBL PRM BUILD ODT PORTION OF PGM TEMPLATE
QPRPH01P PRM LEXICAL, SYNTAX, SEMANTIC ANALYSIS
QPRPH02P PRM BUILD SYMBOL TABLE, BOM TABLE, ODT
QPRPH03P PRM FINISH PGM TEMPLATE, CREATE PGM
QPRPH11P QPRPH11P STUB FOR EPT BUILD
QPRRNNM1 N->N-1 PROGRAM OBJECT HANDLER
QPRROOTP PRM CONTROL PHASES, WORK AREA CREATION
QPRXRF PRM CROSS REFERENCE LISTING
QPTCHECK CHECK ENTIRE COMMAND
QPTCHKPC CHECK PROMPT CONTROL CONDITIONS
QPTCMSRV COMMAND STRING REVIEW
QPTDFT SUPPLY DEFAULT VALUES
QPTDSPFK DISPLAY ACTIVE FUNCTION KEYS
QPTERMSG ERROR MESSAGE PROCESSOR
QPTERREV ERROR REVIEW SCREEN
QPTEXDEV PROMPTER EXIT PROGRAM FOR DEVICES

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QPTGTINP  GET PARAMETER INPUT
QPTKYPRC  FUNCTION KEY PROCESSOR
QPTPARML  PROMPTER CONTROL MODULE
QPTPERMV  PERMISSIBLE VALUES DISPLAY
QPTPFKRV  PROMPTER HELP PROCESSING
QPTPOP    CALL PROMPT OVERRIDE PROGRAM
QPTPRCSS  PARAMETER AND LIST SCREEN PROCESSOR
QPTSETUP  MAIN PROCESSOR SETUP ROUTINE
QPTSTRNG  COMMAND STRING CREATION
QPTVLINP  VALIDATE INPUT
QPWFSTP   FILE SERVER TRANSACTION PROGRAM & INIT
QPYMINFO  SHR RETRIEVE MACHINE INFORMATION
QPYPAGD1  PAG DSPACCGRP ULTIMATE PROGRAM SOURCE
QPYSAMPD  SAM PRTSAMDTA ULTIMATE PROGRAM SOURCE
QPYVMCTS  DSK RETRIEVE VMC TRACE STATUS
QPZAPC    APPLY PROGRAM CHANGE
QPZARPC   APPLY/REMOVE/INSERT PC
QPZAUTCK  PC AUTHORITY CHECKER
QPZCMPTI  CONVERT MPCI
QPZCOVER  DISPLAY OR PRINT COVER LETTER
QPZCPFI   START CPF PC INTERFACE
QPZCPFIU  START CPF PC INTERFACE-UNATTENDED
QPZCRTEX  CRTPTF INVOCATION EXIT PROGRAM
QPZCRTFX  CREATE PROGRAM TEMPORARY FIX
QPZCRTFX  QPZCRTFX HEADER IN ILE/COBOL
QPZCRTFX  QPZCRTFX API HEADER FOR CBL
QPZCRTFX  QPZCRTFX API HEADER IN RPG
QPZCRTFX  QPZCRTFX HEADER IN ILE/RPG
QPZCRTPT  CREATE PROGRAM TEMPORARY FIX
QPZCVLET  CREATE/FIND COVER LETTERS
QPZDBMGR  PZ DATABASE MANAGER
QPZDLOBJ  DELETE QPZA AND QPZR OBJECTS
QPZDLT    DELETE PTF
QPZDSPPT  DISPLAY PTF STATUS
QPZEND    PZ DATABASE IEXIT
QPZEVNHN  PZ EVENT HANDLER
QPZGENID  GENERATE AND VERIFY PTF ID
QPZGENNM  GENERATE A PTF SAVE FILE OR COVER NAME
QPZGENNM  QPZGENNM HEADER IN ILE/COBOL
QPZGENNM  QPZGENNM API HEADER FOR CBL
QPZGENNM  QPZGENNM API HEADER IN RPG
QPZGENNM  QPZGENNM HEADER IN ILE/RPG
QPZIEXIT  UNLOCK THE MPCI IN QSYS
QPZINSFX  INSTALL PTF CPP
QPZINZSY  INZSYS INTERFACE PGM FOR PTF OBJ CLEANUP
QPZLLGET  GET LIC PTF HISTORY
QPZLLPUT  RESTORE LIC PTF HISTORY
QPZLOGFX  LOG PTFS
QPZLOGFX  QPZLOGFX HEADER IN ILE/COBOL
QPZLOGFX  QPZLOGFX API HEADER FOR CBL
QPZLOGFX  QPZLOGFX API HEADER IN RPG
QPZLOGFX  QPZLOGFX HEADER IN ILE/RPG
QPZLPC    LOAD PROGRAM CHANGES
QPZMODRP  PTF MODULE REPLACEMENT FUNCTION
QPZMRIEX  APPLY/REMOVE/INSERT MRI
QPZPCCR   CREATE PTF - SUPERSEDE CHAIN
QPZPCEXT  IEXIT PROGRAM FOR QPZPCSYS
QPZPTFDT  DISPLAY PTF DETAILS
QPZPTFIN  GO PTF OPTION 7 AND 8
QPZRAPTF  RETRIEVE ALL ACTIVE PTFS
QPZRPC    REMOVE PROGRAM CHANGE
QPZRSTLD  RESTORE OBJECT MANAGER
QPZRTVFX  QPZRTVFX HEADER IN ILE/COBOL
QPZRTVFX  QPZRTVFX API HEADER FOR CBL
QPZRTVFX  RETRIEVE PTF INFO
QPZRTVFX  QPZRTVFX API HEADER IN RPG
QPZRTVFX  QPZRTVFX HEADER IN ILE/RPG
QPZSAVF   COPY PTF
QPZSAVLD  SAVE OBJECT MANAGER
QPZSRD    SAVE/RESTORE/DELETE PTF INFO BY PVOL
QPZSYNC   SYNCHRONIZE PTF SAVFS AND PTF DATABASE
QPODDJIC  DIRECTORY JOURNAL IC
QPODDSRC  DIRECTORY DATA SPACE RECOVERY
QPODIPLR  DIRECTORY IPL RECOVERY
QPODRCLM  DIRECTORY RECLAIM
QPODRCLT  TREE PROCESSOR FOR IFS DIRECTORY RECLAIM
QPODROOT  CREATE/VERIFY ROOT DIRECTORY
QPOFFSWK  INITIALIZE HOME DIRECTORY
QPOLCDSN  F KEY PROGRAM FOR DISPLAY ENTIRE NAME
QPOLCIUP  WRKLNK INTERACTIVE USER PROFILE
QPOLCUAU  WRKLNK UIM DELETE OPTION UPDATE
QPOLIHOM  INITIALIZE HOME DIRECTORY
QPOMSJML  MUTEX STATUS DISPLAY SCREEN FRONT-END
QPOMSMTX  MUTEX STATUS DISPLAY SCREEN PROCESSOR
QPOQINIT  INIT QSYS FS PORTION OF SAG
QPOQUSTG  RETRIEVE POQ USER STORAGE AREA
QPOWINIT  POSIX PROCESS INIT PROGRAM
QPOWKRNL  KERNEL INITIALIZATION PROGRAM
QPOWTERM  POSIX PROCESS TERMINATION PROGRAM
QQAEXIT2  EXIT-2 PROG FOR LICENSED PROG 5738-QA1
QQAINSTL  Q&A EXIT PROGRAM FOR BOSS OPTION 1
QQAKASGN  ASSIGN SEARCH WORDS
QQAKAUTH  BUILD AUTHORIZED LIST ROUTINE
QQAKCLSE  CLOSE QUESTION AND ANSWER FILES
QQAKDSCR  REVISE DESCRIPTORS
QQAKESEL  CANDIDATES AVAILABLE FOR CHANGE
QQAKGETI  GET THE TITLES FROM THE ALT TITLE LIST
QQAKIEXT  MAIN PROCESSING ROUTINE FOR Q AND A
QQAKOPEN  Q&A OPEN FILE MODULE
QQAKPARM  CREATE CANDIDATE QUESTION, INPUT PARMS
QQAKQSR1  QQAKQSR1 INCLUDING QUERY
QQAKQSR2  DATA MANIPULATION ROUTINE FOR Q&A
QQAKSSW   Q&A SORT SEARCH WORDS
QQAKSWDL  Q&A BUILD TITLE LST A SW HASH
QQAKTEXT  WORK WITH QUESTION
QQAKXX50  Q&A MODULE TO DISPLAY TITLE LIST
QQAKXX99  CONTINUE Q&A SEARCH FOR ASNWER
QQAKOXOO  DATABASE, TOPICS AND SEARCH WORD LISTS
QQAKO500  Q&A PANEL QAD0500 AND QAD1500 PROCESSOR
QQAKO510  PRESENT,PREPARE,PROCESS QAD0510
QQAK1000  Q&A MODULE TO WORK WITH A QUESTION
QQAK1199  Q&A SEARCH KEYS SELECTION
QQAK1299  Q&A SEARCH BY KEYS WITH HIT COUNTS
QQAYIEXT  IEXIT ROUTINE FOR QQAYSERV
QQAYRQTR  REQUESTOR FOR QA
QQAYSERV  Q & A SERVER
QQAOBTCH  Q&A BATCH SUPPORT
QQAOCPP   Q&A CPP
QQAOMAIN  MAIN PROCESSING ROUTINE FOR Q AND A
QQA2ANSR  ANSWER QUESTIONS AND ANSWERS
QQA2CHNG  CHANGE DATABASE ROUTINE FOR Q&A
QQA2DELT  DELETE QUESTIONS AND ANSWERS
QQA2EDIT  USE THE EDIT INTERFACE, MENU
QQA2REVW  Q&A MODULE TO DO REVIEW
QQA2SAVE  SAVE AND RESTORE Q&A DATABASE ROUTINE
QQA2SRCH  Q&A SEARCH MODULE
QQA4PUB   PUBLISH CANDIDATE QUESTIONS
QQMGBTBL  BUILD TABLE LIST FUNCTION
QQQACTIV  QUERY IMPLEMENTATION
QQQBLQDT  OPNQRYF COMMAND BUILD QUERY DEFINITION
QQQCHGA   CPP FOR CHGQRYA  COMMAND
QQQCHGAP  CL PROMPTER FOR CHGQRYA  COMMAND
QQQGET    QUERY I/O PROCESSING
QQQIMPLE  QUERY IMPLEMENTATION
QQQISVSU  QUERY ISV PROCESSING
QQQITEMP  QUERY IMPLEMENT TEMPORARY RESULT
QQQJDCMP  QUERY JOIN DECOMPOSITION
QQQJOBST  JOB SET UP PROCESSING FOR QUERY
QQQMKF    QUERY MULTI-KEY FROGGER
QQQOPNQF  OPNQRYF COMMAND PROCESSING PROGRAM
QQQOPTIM  QUERY OPTIMIZATION
QQQPARSE  OPNQRYF COMMAND PARSE EXPRESSION
QQQQEXIT  QUERY EXIT PROCESSING
QQQQFMSG  OPEN QUERY FILE MESSAGE MAPPING
QQQQRY    QQQQRY HEADER IN ILE/COBOL
QQQQRY    QQQQRY API HEADER FOR CBL
QQQQRY    QQQQRY API
QQQQRY    QQQQRY API HEADER IN RPG
QQQQRY    QQQQRY HEADER IN ILE/RPG
QQQQUERY  QUERY MAIN LINE PROCESSING
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QQQSETUP QUERY SET UP PROCESSING
QQQSQCMP QUERY SUBQUERY COMPOSITION TO JOIN
QQQTKZ TOKENIZER FOR NATIVE OPNQRYF COMMAND
QQQTKZ38 TOKENIZER FOR S/38-VIEW OPNQRYF COMMAND
QQQTSORT QUERY SORT MODULE
QQQVALID QUERY VALIDATION
QQQVAP VALIDATE ACCESS PLAN
QQQVFMT VALIDATE FORMAT
QQQVJOIN VALIDATE JOIN SPECS
QQQVSEL VALIDATE SELECTION
QQQVWCMP QUERY VIEW COMPOSITION
QQQVWFLD QUERY VIEW FILE FIELD PROCESSING
QQQVWRCY QUERY VIEW FILE RECOVERY
QQUDA QQUDA - QUERY INITIALIZATION
QQUDT QQUDT - BUILD MASTER FIELD LIST
QQUDY QQUDY - LANGUAGE COLLATING SEQUENCES
QQUMITXT CONVERT TEXT DOCUMENTS TO QUERY DEF
QQUPD QQUPD - PRINT QUERY DEFINITION
QQURA QQURA - RUN-TIME INITIALIZATION, CLEANUP
QQURB QQURB - RUN-TIME OUTPUT TO DISPLAY
QQURC QQURC - GET MULTI-COPY DOCUMENTS
QQURD QQURD - RUN-TIME OUTPUT TO PRINTER
QQURE QQURE - DETERMINE THE REPORT FORMAT
QQURG QQURG - RUN-TIME RECORD SELECTION
QQURI QQURI - SUMMARY OUTPUT TO DATABASE FILE
QQURJ QQURJ - DETAIL OUTPUT TO DATABASE FILE
QQUTA QQUTA - OUTPUT TEXT/MERGE INSTRUCTIONS
QQUTB QQUTB - DATA/TEXT MERGE DRIVER
QQUTC QQUTC - OUTPUT TEXT/MERGE DATA
QQUTF QQUTF - CREATE DCA L3 DOCUMENT
QQUTH QQUTH - BUILD DCA L3 DOCUMENT BODY
QQUXQRYR QUERY RUN EXIT-API
QQXBLDIF MODULE TO BUILD OBJECT FROM QRYDFN
QQXCA ANALYZE QRYDFN MODULE
QQXCF EXTRACT FORM INFO MODULE
QQXCFQDT SAA QUERY CREATEFILEFROMQDT M2 CF
QQXCHGOI MODULE TO CHANGE OBJECT INFORMATION
QQXCI INITIAL CONVERSION INFO REQUEST MODULE
QQXCKNAM MODULE TO CHECK THE VALIDITY OF OBJ NAME
QQXCLIMX CPP FOR CRT & RTV COMMANDS
QQXCLITF QUERY CPI CL COMMAND INTERFACE RTN
QQXCLSTP STRQMPRC CPP
QQXCLSTQ CPP FOR STRQMQRY CL COMMAND
QQXCLVSP STRQMPRC CPP
QQXCLVSQ CPP FOR STRQMQRY CL COMMAND
QQXCQ EXTRACT QUERY INFO MODULE
QQXCRTEM BUILD EDIT MASK FOR VARIOUS EDIT TYPES
QQXDSPRT MODULE TO DISPLAY A REPORT
QQXDSPRX MODULE FOR QQXDSPRT EXIT PROGRAM
QQXDSTSP MODULE TO DESTROY A TEMPORARY SPACE
QQXDTOBJ QQXDTOBJ - PLMI ROUTINE TO DELETE AN OBJ
QQXEDBFD SAA QUERY EXTRACT DB FILE DESC M2 CF
QQXEDBMD QM EXTRACT DB MEMBER DESC M2 CF
QQXEDBOV SAA QUERY EXTRACT DB OVRIDES M2 CF
QQXEE ENVIRONMENT EXIT PROGRAM FOR QM CPI
QQXFILE QUERY CPI FILE SUPPORT MODULE
QQXFRMPR SAA QUERY PRINT FORM PLMI/UIM
QQXFRMPX STUB MODULE FOR QQXFRMPR EXIT PROGRAM
QQXJBINF RETRIEVE JOB INFO
QQXMAIN MAIN ENTRY INTO THE QUERY MANAGER
QQXMAINX STUB MODULE FOR QQXMAIN EXIT PROGRAM
QQXMKPSP MODULE TO CREAT PERM OBJECT
QQXMKTSP MODULE TO CREAT TEMPOARY SPACE
QQXMSGQU QM JOB LOG MANIPULATION RTN
QQXOBJPR MODULE TO PRINT OBJECTS
QQXOBJPX STUB MODULE FOR QQXOBJPR EXIT PROGRAM
QQXPFINF RETRIEVE PRINT FILE INFO
QQXQRYSV QUERY CPI QUERY OBJECT SAVE HANDLER
QQXRPTLE DISPLAY REPORT LIST EXIT
QQXRSLOB MODULE TO RESOLVE (& LOCK & AUTH CHECK)
QQXRTTXT RETRIEVE TEXT TRANSLATION
QQXRTVOI MODULE TO RETRIEVE OBJECT INFORMATION
QQXSQL SAA QUERY CPI SQL INTERFACE
QQXSQLEX SAA QUERY CPI SQL EXIT MODULE
QQXSYSVL RETRIEVE SYSTEM VALUES
QQXUNLCK MODULE TO UNLOCK AN OBJECT
QQXXLATE CCSID CONVERSION ROUTINE
QRAASNKB 3270 RA ASSIGN KBD ASSIGN MAP MODULE
QRAHELP HELP MODULE FOR 3270 REMOTE ATTACH
QRCDEBUG GENERAL DEBUG FUNCTIONS FOR RECLAIM
QRCDMGLG LOGGING OF DAMAGE ON HISTORY LOG
QRCDMGNA DEFAULT PGM FOR DAMAGE NOTIFICATION
QRCDMGNT DEFAULT PGM FOR DAMAGE NOTIFICATION
QRCDMGNV DEFAULT PGM FOR DAMAGE NOTIFICATION
QRCIMPLN DAMAGE NOTIFICATION DURING IMPL
QRCINSRT INSERT OBJECT INTO QRCL LIBRARY
QRCLAIM RECLAIM STORAGE DRIVER
QRCLENUP PERFORM CLEANUP ON OBJECTS
QRCOMPST PROCESS COMPOSITE OBJECTS
QRCPDMGL LOGGING OF DAMAGE ON HISTORY LOG
QRCPDMGN DEFAULT PGM FOR DAMAGE NOTIFICATION
QRCSEPOB SEPARATE OBJECTS OWNED INTO CLASSES
QRCSIMPL PROCESS SIMPLE OBJECTS
QRCVDTAQ QRCVDTAQ HEADER IN ILE/COBOL
QRCVDTAQ QRCVDTAQ API HEADER FOR CBL
QRCVDTAQ RECEIVE FROM DATA QUEUE
QRCVDTAQ QRCVDTAQ API HEADER IN RPG
QRCVDTAQ QRCVDTAQ HEADER IN ILE/RPG
QREBLT SYSTEM DEPENDENT BUILTIN FUNCTIONS
QRECDBMI CALLED BY CALLREXI TO DELETE DBMI META
QRECHGPR CHGREXPRF COMMAND CPP
QRECKOVR OBTAINS OVERRIDE STATUS OF STD FILES___
QRECMD AS/400-SPECIFIC COMMAND HANDLER
QRECREXT SYSTEM DEPENDENT REXX SEARCH FOR EXECS
QREDSPPR DSPREXPRF COMMAND CPP
QREEXITS AS/400 EXIT PACKAGE
QREFIO SKELETON FILE I/O FOR 1ST REXX RELEASE
QREHUGE AS/400-SPECIFIC HUGE ROUTINES
QREKBIO AS400 TERMINAL I/O
QREMETA AS/400-SPECIFIC FOR META
QREMISC MISSING C LIBRARY FUNCTIONS
QREMSGRC SETMSGRC() SOURCE CODE
QREPMSGS MESSAGE HANDLING SUPPORT FOR REXX
QREQSRNK REXX EXTERNAL DATA QUEUE CLEANUP
QREQUEUE AS/400 QUEUEING
QRERMSGS REXX MESSAGE SERVICES
QRERTVCV CHGREXPRF COMMAND POP
QRERTVDQ RETRIEVE REXX PROFILE FOR REXX DATA Q
QRERTVPR RTVREXPRF COMMAND CPP
QRESTOR MEMORY MANAGEMENT FOR AS400 REXX
QRESXCAL PROGRAM TO CALL A USER EXIT PROGRAM
QRESXFND PROGRAM TO RESOLVE USER SYSTEM EXITS
QRETOKNZ AS/400-SPECIFIC FOR TOKENIZATION
QRETRACE SYSTEM DEPENDENT MODULE FOR TRACE VALUE
QREVPOOL REXX VARIABLE POOL REQUEST PROCESSOR
QREXBUF PLMI CODE - ADDREXBUF/RMVREXBUF CPP
QREXCMD PROGRAM TO INVOKE REXX COMMANDS
QREXFPGM RESOLVE AND XCTL TO EXT FUNC PGM OBJ__
QREXIMPC REXX IMPLIED COMMANDS HANDLER
QREXINTC STRREXPRC CPP
QREXINTZ REXX LOW LEVEL INITIALIZATION ROUTINE
QREXINVX REXX INTERPRETER INVOCATION EXIT
QREXMETA REXX META DATA INPUT/OUPUT TO DBMI ___
QREXQ REXX QUEUEING API FUNCTION
QREXTOD SYSTEM DEPENDENT MODULE FOR RETRIEVE TOD
QREXTRC TRCREX CPP
QREXUNIN LOW LEVEL UNINITIALIZATION MODULE
QREXVAR REXX VARIABLE POOL EXTERNAL INTERFACE
QREXX REXX START UP ROUTINE
QREXX REXX INTERPRETER INVOCATION API
QREXXX REXX C "MAIN" FUNCTION
QRFCLOSE RF CLOSE - EOS OR RELEASE
QRFDWNLD DOWNLOAD SUPPORT FOR 4701 CONTROLLER
QRFERP RF ERROR PROCESSOR
QRFGET RF GET MODULE
QRFIOCMP RF REQIO COMPLETE EVENT HANDLER
QRFNTYEX EXCEPTION HANDLER FOR PASSTHRU AND DWNLD
QRFOPEN RF OPEN PROCESSING
QRFPSR RETAIL/FINANCE PSR MODULE
QRFPSRDT RF PSR DATA PROCESSOR

QRFPSREH RF PSR EVENT HANDLER FOR REQIO COMPLETE
QRFPTHRU RETAIL PASSTHRU PROGRAM
QRFPUT RETAIL/FINANCE FM PUT MODULE
QRFRST RF RESTORE MODULE
QRFSUSPD RF SUSPEND MODULE
QRFVRYON VARY ON PROCESSING
QRFXLT RF XLATE MODULE
QRGXINIT OPM RPG PROGRAM INITIALIZATION
QRMCANSE RM/COBOL-85 NON-NUMERIC STRING EDIT
QRMCCARG RM/COBOL-85 C$CARG
QRMCCOM RM/COBOL-85 COMMON SUBROUTINE
QRMCDBUG RM/COBOL 85 DEBUGGER
QRMCDEDT RM/COBOL-85 DE-EDIT NUMERIC STRING
QRMCEXPN RM/COBOL-85 EXPONENTIATE
QRMCLIO1 RM/COBOL-85 RUNTIME LIB I/O OPEN/CLOSE
QRMCLIO2 RM/COBOL-85 LOGICAL I/O READ
QRMCLIO3 RM/COBOL-85 LOGICAL I/O WRITE
QRMCLIXH RM/COBOL-85 LIO EXCEPTION HANDLER
QRMCLVIO LOW VOLUME (WORK STATION) I/O
QRMCMAIN M/COBOL-85 MAIN RUNTIME ENTRY
QRMCNARG RM/COBOL-85 C$NARG
QRMCNSE RM/COBOL-85 NUMERIC STRING EDIT
QRMCRERR RM/COBOL-85 C$RERR
QRMCSORT RM/COBOL-85 SORT/MERGE
QRMCWRU RM/COBOL-85 C$WRU
QRNXINIT ILE RPG PROGRAM INITIALIZATION
QRNXIO ILE RPG DATA MANAGEMENT INTERFACE
QRUADALC ADD ALERT CODE RECORDS TO ALERT TABLE
QRUADALD ADD ALERT DESC ID REC TO ALERT TABLE
QRUCHGAT CHANGE ALERT TABLE
QRUCRTAT CREATE ALERT TABLE
QRUDLTDS DELETE ALERT CODE REC AND ALERT DESC ID
QRUGETDS RETURN THE NEXT AVAILABLE ALERT DESC ID
QRUPTSAL LOG ENTRY IN SERVICE ACTIVITY LOG
QRURASEV HANDLER FOR RAS EVENT
QRURTVRD RETRIEVE RECORD FROM RCT
QRUSDMSG SEND RAS MESSAGE TO QSYSOPR
QRWADDDE RDB DIRECTORY ADDRDBDIRE PROGRAM
QRWCHGDE RDB DIRECTORY CHGRDBDIRE PROGRAM
QRWCHGPO RDB DIRECTORY CHGRDBDIRE PROMPT OVERRIDE
QRWDDMIF RW DDM INFORMATION
QRWDSPDE RDB DIRECTORY DSPRDBDIRE PROGRAM
QRWEVENT DDM EVENT HANDLER
QRWLJDRI RETRIEVE JOB DRDA/DFM INFORMATION API
QRWRMVDE RDB DIRECTORY RMVRDBDIRE PROGRAM
QRWSARDB DDM RW ACCESS RDB
QRWSBIND RW SOURCE SIDE BIND
QRWSCMMT DDM AR COMMITMENT CONTROL
QRWSDSCD RW SOURCE SIDE DESCRIBE COMMANDS
QRWSEXEC RW SOURCE SIDE EXECUTION ENVIRONMENT
QRWSINTR DDM AR INTERRUPT RDB
QRWSQRY RW SOURCE SIDE QUERY PROCESSOR
QRWTARDB DDM RW TARGET ACCESS RDB
QRWTBIND RW TARGET SIDE BIND
QRWTCMMT DDM TARGET COMMITMENT CONTROL
QRWTDSCD RW TARGET SIDE DESCRIBE COMMANDS
QRWTEXEC RW TARGET SIDE EXECUTION ENVIRONMENT
QRWTINTR DDM TARGET INTERRUPT RDB REQUEST
QRWTQRY RW TARGET SIDE QUERY PROCESSOR
QRWVLDCK VALIDITY CHECKER FOR RDB DIR COMMANDS
QRWWKEXT RDB DIRECTORY WRKRDBDIRE EXIT PROGRAM
QRWWRKDE RDB DIRECTORY WRKRDBDIRE PROGRAM
QRWXBLDF BUILD FDOCA DESCRIPTOR
QRWXPRSF RW PARSE FDOCA FUNCTIONS
QRZACT SRM EXT INT LIST ACTION MODULE
QRZBLDAS BUILD ASSOCIATED SPACE FOR SRM
QRZBLDIX BUILD SRM INDEX OBJECTS
QRZCEC SRM EXTERNAL INTERFACE DESIGN
QRZCEXIT QRZCHGDR INVOCATION EXIT MODULE
QRZCFG CONFIGURATION ACTION MODULE
QRZCFGA SRM ADD CFG DSC ACTION MODULE
QRZCFGD SRM WORK WITH CFG DSC MODULE
QRZCFGE CONFIGURATION EXIT MODULE
QRZCFGS SRM WORK WITH CFG STATUS MODULE
QRZCHGDR CHANGE DEVICE RESOURCE MODULE
QRZCLRTP RZ CLEAR THE TOPOLOGY DATA ROUTINE
QRZCMN SRM EXTERNAL INTERFACE DESIGN
QRZCNDL RETRIEVE PORT RESOURCE CANDIDATES LIST
QRZCNV SRM CONVERSION ROUTINE
QRZCRN CHANGE RESOURCE NAME TOOL
QRZCRTOB CREATE SRM INTERNAL OBJECTS
QRZCSA WORK WITH COUPLED RESOURCE
QRZDCCMN CREATE LIST OF LINE DESCRIPTIONS
QRZDCLST MAKE LIST OF WORK STATION CDS
QRZDCMN DSPHDWRSC *CMN OUTFILE SUPPORT
QRZDCOPY COPY DATA TO SRM INTERNAL OBJECTS
QRZDCSA WORK WITH COUPLED RESOURCE
QRZDCSTG CREATE LIST OF DEV DESCIPTIONS
QRZDEXIT SRM-DB DSPHDWRSC EXIT MODULE
QRZDHRRT DSPHDWRSC COMMAND ROUTER
QRZDHW DELETE HARDWARE RECORD
QRZDLT DELETE SRM DATA RECORDS
QRZDLWS DSPHDWRSC *LWS OUTFILE SUPPORT
QRZDPRC DSPHDWRSC *PRC OUTFILE SUPPORT
QRZDSTG CREATE AND POPULATE STG OUTFILE
QRZDSTG2 SRM BUILD STG OUTFILE RECORDS 2
QRZDTRA CREATE AND POPULATE TR LAN OUTFILE
QRZGET GET SRM DATA RECORDS
QRZGETRH GET RESOURCE HIERARCHY
QRZGTRNH GET RESOURCE NAME HIERARCHY
QRZHOUTF CREATE OUTFILE WITH HDW DATA
QRZHPRES HARDWARE RESOURCE PRESENTATION MODULE
QRZHRMEH RESOURCE ALTER EVENT HANDLER
QRZHRMIN HARDWARE RESOURCE MANAGER IPL INIT PGM
QRZHRMRN PUT RESOURCE TRACKING NAME IN ERROR LOG
QRZHWPRT PRINT SRM-DB HARDWARE DATA
QRZIEXIT SRM-DB INVOCATION EXIT MODULE
QRZINIT SRM INITIALIZATION MODULE
QRZLAN LAN SRM
QRZLANLI LIST TOKEN-RING LAN DATA
QRZLBLC LABEL MIGRATION AID CHANGE
QRZLBLD LABEL MIGRATION AID DISPLAY
QRZLBLHW LABEL MIGRATION AID HARDWARE ANALYSIS
QRZLBLST MIGRATION AID LABEL LIST BUILDER
QRZLBLUP LABEL MIGRATION AID UPDATE
QRZLBLO1 LABEL MIGRATION AID - STUB 01
QRZLBLO2 LABEL MIGRATION AID - STUB 02
QRZLBLO3 LABEL MIGRATION AID - STUB 03
QRZLBL4I LABEL MIGRATION AID MIG4 INTERFACE
QRZLCPRT DISPLAY SOFTWARE RESOURCES CPP
QRZLEXIT SRM-DB QRZLOCK EXIT MODULE
QRZLIST SRM LIST LOCAL HARDWARE MODULE
QRZLOCK SRM LOCK PROCESSOR
QRZLOUTF CRT OUTFILE WITH SOFTWARE PRODUCT DATA
QRZLPRES DSP/PRT SOFTWARE PRODUCT DATA
QRZLWS SRM EXTERNAL INTERFACE DESIGN
QRZLWS2 SRM EXTERNAL INTERFACE DESIGN
QRZMGLVL MIGRATION AID PHASE 0
QRZMIG1 MIGRATION AID PHASE 1
QRZMIG2A MIGRATION AID PHASE 2A
QRZMIG2B HARDWARE MIGRATION AID PHASE 2B
QRZMIG3 MIGRATION AID PHASE 3
QRZMIG4 HARDWARE MIGRATION AID PHASE 4
QRZPTRA TRA PRINT FOR DSPHDWRSC *PRINT
QRZPUT PUT RECORDS TO SRM-DB
QRZRDHDW READ SRM-DB HARDWARE RESOURCE RECORD(S)
QRZRDPTH READ SRM-DB PATH CONNECTION DATA
QRZRECOV EXTERNAL SRM-DB RECOVERY MODULE
QRZROUTR SRM-DB MAINLINE ROUTER
QRZRSTOH RESTORE SRM SPACE OBJECTS
QRZRTDSA RETRIEVE DIRECT SELECT ADDRESS FOR VARY
QRZRTVSN RETRIEVE SYSTEM SERIAL NUMBER
QRZSAVFD HRM SAVE FILE DEFINITIONS
QRZSRMEH SRM-DB EVENT HANDLER
QRZSTG SRM EXTERNAL INTERFACE DESIGN
QRZSTG2 SRM EXTERNAL INTERFACE DESIGN
QRZSTG3 STORAGE ACTION MODULE FOR 370 TAPES
QRZTRA TRA DISPLAY EXTERNAL INTERFACE
QRZTRF TERMINATE CONFIGURATION
QRZUNLCK UNLOCK SRM INTERNAL OBJECTS

QRZUPD UPDATE RECORDS IN SRM
QRZUPDTF UPDATE TOPOLOGY FLAG
QRZWHRRT PRINT SRM-DB HARDWARE DATA
QSACLOSE SNUF FM CLOSE
QSADEVSL SNUF DEVICE SELECTION
QSAEVMON SNUF FM EVENT MONITORS
QSAGET SNUF FM GET
QSAMSGBD SNUF MESSAGE HANDLER
QSAOPEN SNUF FM OPEN
QSAPUT SNUF FM PUT
QSARSUME SNUF FM RESUME PROCESSING ROUTINE
QSASUSPD SNUF FM SUSPEND PROCESSING ROUTINE
QSAVRYON SNUF FM VARY ON PROCESSING ROUTINE
QSAWMPSR SNUF FM PSR PROCESSING ROUTINE
QSCAEXIT LPDA-2 IEXIT MODULE
QSCAPIEX SAVE APAR DATA I-EXIT PROGRAM
QSCAPLST LIST APAR DATA PANEL
QSCAUTCK PC AUTHORITY CHECKER
QSCAUTOS SAVE APAR DATA
QSCAXFMT FORMATTER FOR THE RUNLPDA COMMAND
QSCCHKCT CHECK COMMUNICATIONS TRACE CPP
QSCCOPY CALL COPY EXECUTION
QSCCPY COPY SCREEN
QSCCPYB BEGIN COPY SCREEN
QSCCPYE END COPY SCREEN
QSCCPYLG LIST ERROR LOG CPP
QSCDH SERVICE DATA HANDLER
QSCDJI DUMP JOB INTERNAL CPP
QSCDJOB DUMP JOB CPP
QSCDLTAP DELETE APAR DATA CPP
QSCDLTCT DELETE COMMUNICATIONS TRACE CPP
QSCDMPPS DUMP POINTERS IN A SPACE
QSCDOBJ DUMP OBJECT CPR
QSCDSO DUMP SYSTEM OBJECTS CPR
QSCDSS DISPLAY SERVICE STATUS
QSCDSTSO DESTROY SERVICE COMMUNICATION OBJECT
QSCEND END SERVICE MODE CPP
QSCENDCT END COMMUNICATIONS TRACE CPP
QSCEXTCT INVOCATION EXIT FOR COMMUNICATIONS TRACE
QSCFSODD FORMAT AND SENDOUT DUMP DATA
QSCGJI GET INTERNAL JOB DUMP
QSCGJOB GET JOB DUMP
QSCGSO GET SYSTEM OBJECTS
QSCIEXIT SC IEXIT PROGRAM
QSCINTDD INTERNAL DUMP DATA
QSCJSDMP JOB STORAGE DUMP ROUTINE
QSCLID LIST INTERNAL DATA
QSCLOCSO LOCATE SERVICE OBJECT
QSCMAG MATERIALIZE AND DUMP ACCESS GROUP
QSCMAUTL MATERIALIZE AND DUMP AUTH LIST
QSCMBSS MATERIALIZE AND DUMP BYTE STRING SPACE
QSCMCB DUMP COMMIT BLOCK ATTRIBUTES
QSCMCD MTRLZ AND DUMP CONTROLLER DESCRIPTION
QSCMCNNL MATERIALIZE AND DUMP CONNECTION LIST
QSCMCOS MATERIALIZE AND DUMP CLASS OF SERVICES
QSCMCTX MATERIALIZE AND DUMP CONTEXT
QSCMCUR MATERIALIZE AND DUMP CURSOR
QSCMDICN MATERIALIZE AND DUMP DICTIONARY
QSCMDMPS MATERIALIZE AND DUMP DUMP SPACE
QSCMDS MATERIALIZE & DUMP DATA SPACE
QSCMDSI MATERIALIZE & DUMP DS INDEX
QSCMIDX MATERIALIZE & DUMP INDEX
QSCMJMQ MATERIALIZE AND DUMP JOB MSG QUEUE
QSCMJPRT MATERIALIZE AND DUMP JOURNAL PORT
QSCMJSPC MATERIALIZE AND DUMP JOURNAL SPACE
QSCMLUD MTRLZ & DUMP LOGICAL UNIT DESCRIPTION
QSCMMCTX MATERIALIZE AND DUMP MACHINE CONTEXT
QSCMMOD MATERIALIZE AND DUMP MODE
QSCMMODL MATERIALIZE AND DUMP MODULE
QSCMND MTRLZ & DUMP NETWORK DESCRIPTION
QSCMNWID MATERIALIZE AND DUMP PORT GROUP (NWID)
QSCMPGM MATERIALIZE AND DUMP PROGRAM
QSCMQ MATERIALIZE AND DUMP QUEUE
QSCMSP MATERIALIZE AND DUMP SPACE
QSCMSTMF MATERIALIZE AND DUMP BYTE STRING SPACE
QSCMUP MATERIALIZE AND DUMP USER PROFILE
QSCOBJDM OBJECT DUMP
QSCOIR RETRIEVE SERVICE OIR
QSCONEOB SERVICE SINGLE OBJECT DUMP
QSCPMTCT PROMPT CONTROL FOR COMMUNICATIONS TRACE
QSCPRTCT PRINT COMMUNICATIONS TRACE CPP
QSCPRTC1 PRINT COMMUNICATIONS TRACE
QSCPRTEL PRINT ERROR LOG COMMAND PROCESSING
QSCPTFSN UPDATE SRM WITH MPCI INFO
QSCPTMSG VFYPRT MSG QUEUE HANDLER
QSCPTREC TRACE RECORDS OUTPUT FORMATTER
QSCPUTR SERVICE OPEN/CLOSE ROUTINE
QSCRH SERVICE REQUEST HANDLER
QSCSAVAP SAVE APAR DATA CPP
QSCSPCDM SPACE DUMP ROUTINE
QSCSTRCT START COMMUNICATIONS TRACE CPP
QSCSVJOB SERVICE JOB CPR
QSCTEVTH TRACE JOB EVENT HANDLER
QSCTI TRACE INTERNAL DATA
QSCTJIEX TRACE JOB INVOC EXIT
QSCTJOB TRACE JOB CPP
QSCTJOBR TRACE JOB REMOTE SETUP ROUTINE
QSCVFYPT VERIFY PRINTER COMMAND
QSCVLICL GET VLIC LOG ID
QSCVPIEX VERIFY PRINTER IEXIT
QSCWMINT SERVICE/WORK MANAGEMENT INTERFACE
QSDAMCJ2 CREATE TEMPORARY JOB STRUCTURES
QSFCRT SFL CREATE SPACE
QSFGET SFL GET & RETURN SFL RECORD
QSFHSFL STUB
QSFMQDSP STUB
QSFPUT QSFPUT
QSGREPAK SGREPAK - REPACK PGM OBJECT
QSHDCPLP AUTO-DECOMPRESS LICENSED PROGRAMS
QSHDLPDP DELETE PDP OBJECTS FROM QSYS
QSHINT1 AUTO DCPOBJ INSTALL CODE
QSHRCVOB CMP/DCPOBJ RECOVERY CODE
QSHTERSE COMPRESS OBJECTS CPP USING TERSE
QSICLOSE FILE CLOSE CPP
QSIEFEVH QSIEFEVH--EXPEDITED FLOW EVENT HANDLER
QSIERP1 QSIERP1--I/O ERROR HANDLER
QSIERP2 SI FM DETECTED ERROR PROCESSOR
QSIFMH7 QSIFMH7--PROCESS FMH-7
QSIGET QSIGET--GET FROM ISS FILE
QSIINASP QSIINASP
QSIIOCMP QSIIOCMP--I/O COMPLETE EVENT HANDLER
QSINFEVH QSINFEVH--NORMAL FLOW EVENT HANDLER
QSIOPEN SI FM FILE OPEN MODULE
QSIPUT SI APPC PUT MODULE
QSIRSP QSIRSP--SEND RESPONSE
QSIRSPAT QSIRSPAT--SEND RESPONSE TO ATTACH
QSIRVPIP QSIRVPIP--RECEIVE PIP
QSITPP QSITPP--TERMINATION PHASE PROCESSING
QSKDUMP STREAMS OBJECT DUMP PROGRAM
QSKMAINT STREAMS MAINTENANCE PROGRAM
QSLCLOSE CLOSE FOR SLUT1
QSLERBLD SLU1 MESSAGE BUILDER
QSLGET QSLGET
QSLINASP SLUT1 LUD ASP INITIALIZATION
QSLINLLS QSLINLLS: SL INITIALIZE LU-LU SESSION
QSLOPEN SL OPEN
QSLPUT QSLPUT
QSLRST QSLRST
QSLSNA QSLSNA - SNA ENFORCER FOR STEADY STATE
QSLSPEND QSLSPEND
QSLUSMON QSLUSMON-UNSOL DATA HANDLER
QSMADDSF ADD SERVICE FUNCTION AREA
QSMASFDR ACTIVE SF PROMPT RESPONSE HANDLER
QSMAVPR ALLOCATE/VARY/POWER DEVICE
QSMCCNLE CONTROL CANCEL EVENT HANDLER
QSMCFKEY CF KEY TABLE MANAGER
QSMCSMML CSM MAINLINE
QSMCSMSU CSM STARTUP
QSMDAE CSM DATA AVAILABLE EVENT HANDLER
QSMDELSF DELETE SF AREA

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QSMDKTS   DISKETTE SELECTION
QSMDPM    DISPLAY PROMPT OR MENU
QSMHELP   CSM HELP MEUNS
QSMIEXIT  CSM IEXIT
QSMLDVMC  INTERFACE TO LINK/LOADER TO INSTALL VMC
QSMOODE   OBTAIN OFFLINE DEVICE EVENT HANDLER
QSMPSMR   PRIMARY MENU RESPONSE HANDLER
QSMREQIO  REQUEST I/O GENERATOR
QSMRQDQR  REQUEST QUEUE DEQUEUE ROUTINE
QSMSFDR   SF DISPLAY RESPONSE HANDLER
QSMSFEX   SF END EXCEPTION HANDLER
QSMSFMR   START SF MENU RESPONSE
QSMSSFX   START SF EXCEPTION HANDLER
QSMSTART  START CSM
QSMSTOP   STOP CSM
QSMSUIR   SERVICE UTILITY INTRFC DISPLAY HNDLR
QSMTAPS   TAPE SELECTION
QSNAPI    QSYSINC HEADER FOR FOR COBOL
QSNAPI    QSYSINC HEADER FILE FOR RPG
QSNDDTAQ  SEND TO DATA QUEUE
QSOCACTI  ACTIVATE/DEACTIVATE IPS & AF_SNA
QSOCALOC  ADDIPSLOC CPP
QSOCATPN  ADDSNSTPN CPP
QSOCCA    CHGSNSA   CPP
QSOCCITL  CVTIPSIFC CPP
QSOCCLOC  CHGIPSLOC CPP
QSOCCLTI  CVTIPSLOC CPP
QSOCCTMP  CHGSNSTMP CPP
QSOCCTOS  CHGIPSTOS CPP
QSOCEVTH  ANYNET EVENT HANDLER
QSOCFGIP  CFGIPS CPP
QSOCFGSN  WORK WITH AF_SNA TRANSACTION PROGRAM NAM
QSOCIPO3  WORK WITH IPS LOCATION NAMES
QSOCIPO4  WORK WITH IPS TYPE OF SERVICE
QSOCPA    CHGSNSXXX CPP POP
QSOCPIPS  PRTIPSCFG CPP
QSOCPLOC  CHGIPSLOC POP
QSOCPTOS  CHGIPSTOS POP
QSOCRLOC  RMVIPSLOC CPP
QSOCRTPN  RMVSNSTPN CPP
QSOCSIFC  STR/ENDIPSIFC CPP
QSOCWIFC  WORK WITH IPS INTERFACES
QSOCWIFO  WORK WITH IPS INTERFACES OPTIONS
QSOCWLOO  WORK WITH IPS LOCATION OPTIONS
QSOCWRTE  WORK WITH IPS ROUTES
QSOCWRTO  WORK WITH IPS ROUTES OPTIONS
QSOTRACE  SOCKETS TRACING MODULE
QSOWRKSN  WORK WITH AF_SNA TP NAMES
QSPACCLG  LOG SPOOL & PRINT JOB ACCOUNTING
QSPBLNJE  BUILD NJE FORMAT FROM SPOPENG FORMAT
QSPBPDSK  BLOCK/PUT DISKETTE
QSPBPPRT  BLOCK/PUT PRINTER PUT TO DATA BASE
QSPBSEPP  BUILD SEPARATOR INFORMATION____
QSPCADSP  CONVERT AFPDS TO DISPLAY FORMAT
QSPCHGPI  CHANGE USER PRINT INFORMATION
QSPCHJOB  CHANGE JOB SPOOLED JOB/FILES
QSPCHQPO  CHGOUTQ PROMPT OVERRIDE PROGRAM
QSPCHQVC  CHANGE OUTQ VALIDITY CHECKER
QSPCHSPF  CHANGE SPOOL FILE ATTRIBUTES
QSPCHSPQ  CHANGE SPOOL OUTPUT QUEUE
QSPCHWTR  CHANGE SPOOL WRITER
QSPCIDSP  CONVERT IPDS TO DISPLAY FORMAT
QSPCIPRT  CONVERT IPDS TO PRINT FORMAT
QSPCKPRM  CHECK CARD/DISKETTE OPEN PARAMETERS
QSPCLDSP  CONVERT LINE AND AFPDSLINE FOR DSPSPLF
QSPCLNUP  CLEANUP RWCB JOB & OUTPUT QUEUES
QSPCLOSE  CLOSE SPOOLED FILES
QSPCLOSP  CLOSE SPOOLED FILE API
QSPCLPRT  CONVERT LINE AND AFPDSLINE FOR CPYSPLF
QSPCLSPQ  CLEAR SPOOL QUEUE
QSPCNJOB  CANCEL SPOOL JOB
QSPCNRDR  CANCEL SPOOL READER
QSPCNSPF  CANCEL SPOOL FILE
QSPCNVRT  TEMP VERSION
QSPCNWTR  CANCEL SPOOL WRITER
QSPCPIPO  CHANGE USER PRINT INFO PROMPT OVERRIDE
QSPCPYF   COPY SPOOL FILE
QSPCRQVC  CREATE OUTQ VALIDITY CHECKER
QSPCRSPQ  CREATE SPOOL JOB/OUTPUT QUEUE
QSPCRTSP  CREATE SPOOLED FILE API
QSPCTRDR  HOLD/RELEASE SPOOLING READER
QSPCVDSP  TEMP VERSION
QSPCVPAG  CONVERT SPOOL FILE PAGES
QSPCVPRT  TEMP VERSION
QSPCVSEP  BLOCK SEPARATOR CONVERSION PROGRAM
QSPDAMGE  SPOOL DAMAGE RECOVERY AT IPL
QSPDATAH  SPOOL DATA HANDLER
QSPDFTCP  DEFAULT CPP FOR DATA, ENDINP & ENDJOB
QSPDKTWT  SPOOL DISKETTE WRITER LOGIC
QSPDMGNT  SPOOL JOB DAMAGE NOTIFICATION PGM
QSPDSPF   DISPLAY SPOOL FILE
QSPDSPFA  DISPLAY SPOOL FILE ATTRIBUTES
QSPDSPFM  DISPLAY FILE SPECIFIC WRITER MESSAGES
QSPDSPFX  EXIT PROGRAM FOR QSPDSPF & CPYSPLF
QSPDSPJ   DISPLAY SPOOL JOB
QSPDSPPI  DISPLAY USER PRINT INFORMATION
QSPDSPQ   DISPLAY SPOOL QUEUE
QSPDSPQD  DISPLAY QUEUE DESCRIPTION
QSPDSPR   DISPLAY SINGLE READER
QSPDSPRW  WORK WITH ALL READERS/WRITERS CPP
QSPDSPW   DISPLAY SINGLE WRITER
QSPDSPWM  DISPLAY MESSAGES WRITER IS WAITING ON
QSPDUPQ   SPOOL OBJECT HANDLER FOR CRTDUPOBJ
QSPENDWA  END WRITER ABNORMAL
QSPEXTWI  EXTRACT WRITER PROCESSING INFO
QSPFEOD   SPOOL FORCED END OF DATA
QSPFFACB  SPOOL OBJECT VERIFY ROUTINE
QSPFILES  CREATE DATABASE MEMBERS
QSPFIXUP  SPOOL CLEANUP EVENT HANDLER
QSPFXDTA  SPOOL FIX DCA-L2 DATA MODULE
QSPGETF   COPY FROM SPOOLED FILE
QSPGETSP  GET SPOOLED FILE API
QSPGETSP  QSPGETSP HEADER IN ILE/COBOL
QSPGETSP  QSPGETSP API HEADER FOR CBL
QSPGETSP  QSPGETSP API HEADER IN RPG
QSPGETSP  QSPGETSP HEADER IN ILE/RPG
QSPGETST  GET DETAILED PRINT STATUS
QSPGPJOB  GET/PUT/GET JOB ON JOB QUEUE
QSPHLSPF  HOLD SPOOL FILE
QSPHLSPQ  HOLD SPOOL QUEUE
QSPHLWTR  HOLD WRITER
QSPHNCMD  HANDLE SUB-COMMANDS FROM SCREENS
QSPHNMLT  MULTIPLE OBJECT HANDLER
QSPHNSPQ  SPOOL QUEUE OBJECT HANDLER
QSPHNSTS  HANDLE PRINTING STATUS OPTIONS
QSPIERRS  ISSUE SPOOL INTERCEPT ERROR MESSAGES
QSPMAINT  MAIN MODULE FOR QSPLMAINT JOB
QSPMNCFA  CHANGE SPOOLED FILE ATTRIBUTES BY MENU
QSPMOVJB  CBL INCLUDE FOR QSPMOVJB
QSPMOVJB  MOVE JOB API
QSPMOVJB  QSPMOVJB HEADER IN ILE/COBOL
QSPMOVJB  CSTATUS OT - RPG INCLUDE FOR QSPMOVJB
QSPMOVJB  QSPMOVJB HEADER IN ILE/RPG
QSPMOVSP  CBL INCLUDE FOR QSPMOVSP
QSPMOVSP  MOVE SPOOLED FILE API
QSPMOVSP  QSPMOVSP HEADER IN ILE/COBOL
QSPMOVSP  CSTATUS OT - RPG INCLUDE FOR QSPMOVSP
QSPMOVSP  QSPMOVSP HEADER IN ILE/RPG
QSPOPEN   OPEN SPOOLED OUTPUT FILES
QSPOPENG  OPEN SPOOLED FILE AND GET ATTRIBUTES
QSPOPENP  OPEN SPOOLED FILE AND PUT ATTRIBUTES
QSPOPNSP  OPEN SPOOLED FILE API
QSPOPNWT  SPOOL GENERIC/OPEN WRITER
QSPOPNWX  INVOCATION EXIT PGM FOR OPEN WRITER
QSPPLSTX  WRKSPLF UIM INCOMPLETE LIST EXIT
QSPPMTFA  BUILD CHGSPLFA PROMPT STRING
QSPPMTHF  BUILD HLDSPLF PROMPT STRING
QSPPMTQD  PROMPT QUEUE DESCRIPTION
QSPPRTQ   HANDLE PRINT QUEUE
QSPPRTWT  SPOOL PRINT WRITER
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QSPPSFEX INVOCATION EXIT PGM FOR PSF WRITER
QSPPSFWT SPOOL PSF PRINT WRITER
QSPPUTF COPY TO SPOOLED FILE
QSPPUTSP PUT SPOOLED FILE API
QSPQLSTX DECLARES FOR OUTQ ENTRY WORKSPACE
QSPRCMBR RECLAIM SPOOL MEMBER
QSPRCSTG RECLAIM SPOOL STORAGE
QSPRDR SPOOL READER
QSPRDRAP SPOOL READER ADOPT QSYS PROFILE
QSPRESET RESET SPOOLED DATABASE MEMBER
QSPRJOBQ RETRIEVE JOB QUEUE INFORMATION
QSPRLSPF RELEASE SPOOL FILE
QSPRLSPQ RELEASE QUEUE
QSPRLWTR RELEASE WRITER
QSPROUTQ QSPROUTQ HEADER IN ILE/COBOL
QSPROUTQ QSPROUTQ API HEADER FOR CBL
QSPROUTQ RETRIEVE OUTPUTQ QUEUE INFORMATION
QSPROUTQ QSPROUTQ API HEADER IN RPG
QSPROUTQ QSPROUTQ HEADER IN ILE/RPG
QSPRSTQ SPECIAL OBJECT HANDLER FOR RSTOBJ
QSPRTVPI RETRIEVE USER PRINT INFORMATION
QSPRWTRI QSPRWTRI API HEADER IN CBLLE
QSPRWTRI QSPRWTRI API HEADER IN RPG
QSPRWTRI RETRIEVE WRITER INFORMATION
QSPRWTRI QSPRWTRI API HEADER IN RPG
QSPRWTRI QSPRWTRI HEADER IN ILE/RPG
QSPSAVQ SPECIAL OBJECT HANDLER FOR SAVOBJ
QSPSBMEX INVOCATION EXIT PGM FOR SBMXXXJOB CMDS
QSPSBMJB SUBMIT DATA BASE JOB
QSPSCAN SCAN SPOOL LARGE RECORD
QSPSDTAQ SEND ENTRY TO A DATA QUEUE
QSPSETWI SET WRITER PROCESSING INFO
QSPSNDSP SNDNETSPLF MACRO CALLER
QSPSNDWM SEND MESSAGE WRITER IS WAITING ON
QSPSTCPF KEEP OR CLEAR JOB OR OUTPUT QUEUES
QSPSTRDR START READER
QSPSTWTR START SPOOL WRITER
QSPTRMRW TERMINATE READER/WRITER
QSPWKSTS WORK WITH PRINTING STATUS CPP
QSPWRKF WORK WITH SPOOLED FILES
QSPWTREH SPOOL WRITER EVENT HANDLER
QSPWTRM1 SPOOL WRITER MAIN START
QSQALTER ALTER TABLE
QSQANZPG ANALYZE OR OPEN SQL PROGRAMS
QSQAUTH HANDLE GRANT/REVOKE STATEMENTS
QSQBIND SQL BIND
QSQBLQDT SQL QUERY DEFINITION TEMPLATE BUILDER
QSQCALL HANDLE CALL STATEMENT
QSQCHGPK CHANGE SQL PACKAGE OBJECT HANDLER
QSQCHKS API SQL SYNTAX CHECK
QSQCHKS QSQCHKS HEADER IN ILE/COBOL
QSQCHKS QSQCHKS API HEADER FOR CBL
QSQCHKS QSQCHKS API HEADER IN RPG
QSQCHKS QSQCHKS HEADER IN ILE/RPG
QSQCKAUT CHECK EFFECTIVE AUTHORITIES
QSQCLOSE SQL HARD CLOSE PSEUDO CLOSED CURSORS
QSQCMT SQL COMMIT AND ROLLBACK
QSQCMTER SQL COMMIT AND ROLLBACK
QSQCONN SQL CONNECT
QSQCRTDB SQL CREATE DATA BASE
QSQCRTI SQL CREATE INDEX
QSQCRTT CREATE TABLE
QSQCRTV SQL CREATE VIEW
QSQDELET SQL DELETE
QSQDESC DESCRIBE RUNTIME SUPPORT - DYNAMIC SQL
QSQDLTPK DELETE PACKAGE
QSQDROP HANDLE DROP STATEMENT
QSQENDAG ACTIVATION GROUP EXIT
QSQEXPLN EXPLAIN - LIST CMD PARMS, ACCESS PLANS
QSQFLAG SAA/ANS FLAGGING DRIVER
QSQFTABF ANS FLAGGING PARSE TABLES
QSQFTABS SAA/ANS SQL FLAGGING PARSE TABLES
QSQHSTLX API HOST LEX
QSQICOLL ISQL - COLUMN LIST SOURCE CODE
QSQICPKG CREATE SQLPKG FOR USE BY ISQL
QSQICSTL ISQL DATA BASE LIST SOURCE CODE
QSQIDBL ISQL DATA BASE LIST SOURCE CODE
QSQIDUPR ISQL DLTUSRPRF SESSION HANDLER
QSQIEDIT FUNCTION KEY EDITING FOR SQL PROMPTING
QSQIFMT ISQL STATEMENT FORMATTER
QSQIIXT INVOCATION EXIT PROGRAM
QSQILVL1 PROMPT FOR LEVEL 1 SQL STATEMENTS
QSQILVL2 ISQL PROMPT SCREEN HANDLER
QSQILVL3 SQL PROMPTER LEVEL 3 STATEMENTS
QSQINS SQL INSERT
QSQIPKGL ISQL PACKAGE LIST SOURCE CODE
QSQIPLE SQL PROMPTER LIST EXTENDER
QSQIPOP ISQL - POPUP WINDOW SOURCE CODE
QSQIPRPT SQL PROMPTER ROUTER
QSQIRDBL ISQL RDB LIST SOURCE CODE
QSQISCAN SCANS FOR CLEAR TEXT IN SQL PROMPTER
QSQISHOW SHOW PROMPTED & FORMATTED SQL STATEMENT
QSQITABL ISQL TABLE LIST SOURCE CODE
QSQITBLX ISQL TABLE LIST SOURCE CODE
QSQLABEL HANDLE COMMENT & LABEL STATEMENTS
QSQLCLS SQL LOCK, CLOSE
QSQLCLSE DO PSEUDO CLOSE OF FILE
QSQLCMIT CALLED BY HLL PGM TO DO COMMIT/ROLLBACK
QSQLOPEN SQL OPEN FOR PSEUDO CLOSED FILES
QSQMAC SQL MACRO INTERFACE
QSQMSGAR SQL MESSAGE AR
QSQMSGAS SQL MESSAGE AS
QSQNAME CONVERT SQL NAME TO SYSTEM NAME
QSQOPEN SQL OPEN
QSQPCMD CPP FOR CRTSQLPKG COMMAND
QSQPCPKG AR SIDE OF CREATE PACKAGE
QSQPDBRM HANDLE HOST VARIABLES
QSQPLIST HANDLE ERR MSGS, XREF, ETC
QSQPRCED EXTENDED DYNAMIC SQL API
QSQPRCED QSQPRCED HEADER IN ILE/COBOL
QSQPRCED QSQPRCED API HEADER FOR CBL
QSQPRCED QSQPRCED API HEADER IN RPG
QSQPRCED QSQPRCED HEADER IN ILE/RPG
QSQPREP PREPARE RUNTIME SUPPORT - DYNAMIC SQL
QSQPSTAB DICTIONARY SERVICES - PRECOMPILER/PARSER
QSQRAPLY SQL SEMANTIC ROUTINES
QSQRCHK SQL DATA CHECKER
QSQRCPKG RECLAIM SQL PACKAGE OBJECT HANDLER
QSQRECOV SQL RECOVERY OBJECT HANDLER
QSQREXX SQL TO REXX INTERFACE
QSQRLEX SQL LEXICAL SCAN ROUTINES
QSQRNNM1 STUB MODULE FOR QSQRNNM1
QSQROUTE SQL ROUTER
QSQRPARS SQL PARSER MACHINE
QSQRPTAB SQL PARSE TABLES
QSQRSTPK RESTORE SQL PACKAGE OBJECT HANDLER
QSQRTBLS SCAN TABLES FOR THE SQL GRAMMAR
QSQRXLTR SQL PARSER TRANSLATOR MODULE
QSQRXTRT EXTRACT FIELD DEFINITIONS FOR TABLES
QSQSAVPK SAVE SQL PACKAGE OBJECT HANDLER
QSQSCPKG AS SIDE OF CREATE PACKAGE
QSQSQLNM GET ALTERNATE FILE NAME
QSQSYSNM GET ALTERNATE FILE NAME
QSQSYSPK SQL CREATE SYSPACKAGE VIEW
QSQUPDAT SQL UPDATE
QSQVFIX SQL FIX DEPENDENT VIEWS
QSQVTCHG SQL CHANGE VIEW CREATION TEMPLATE
QSQXCHK SQL XGAM DATA CHECKER
QSQXCUTE EXECUTION RUNTIME INTERPRETER MODULE
QSQXIT SQL EXIT
QSQXPARS PARSER FOR EXTENDED GRAMMAR
QSQXPGM CREATE AND CLEAR EXTENDED SQL AREA
QSQXXLTR TRANSLATOR FOR EXTENDED GRAMMAR
QSRADOPT ADOPT AND PROPAGATE QSYS USER PROFILE
QSRCBALC S/R ALLOCATE CONTROL BLOCK
QSRCLNUP S/R IEXIT CLEANUP ROUTINE
QSRCLOSE ONLINE SAVE FILE CLOSE
QSRCSAVF CLEAR ONLINE SAVE FILE
QSRDSAVF S/R DISPLAY SAVE FILE CPP
QSRDSPY DISPLAY SAVE/RESTORE FILES ON TAPE

QSRDSVOL DISPLAY SAVE/RESTORE FILES ON DISKETTE
QSREVTHD S/R EVENT HANDLER
QSREXDEV EXTRACT DEVICE TYPE USING PATHNAME
QSRFEOD FEOD FOR AN ONLINE SAVE FILE
QSRFMERR ONLINE SAVE FILE ERROR MESSAGE ROUTER
QSRFROBJ FREE STORAGE FOR OBJECTS SAVED
QSRGET GET RECORD FROM ONLINE SAVE FILE
QSRIPLXT SAVE/RESTORE IPL EXIT FOR S/R STORAGE
QSRLSAVF LIST SAVE FILE CONTENTS API
QSRLSAVF QSRLSAVF HEADER IN ILE/COBOL
QSRLSAVF QSRLSAVF API HEADER FOR CBL
QSRLSAVF QSRLSAVF API HEADER IN RPG
QSRLSAVF QSRLSAVF HEADER IN ILE/RPG
QSROPEN OPEN ONLINE SAVE FILE
QSROUTFL SAVE OUTPUT SUPPORT CODE
QSRPSCPR SAVE SYSTEM CPP
QSRPSTIO S/R POST I/O PROCESSING
QSRPUT PUT RECORD TO ONLINE SAVE FILE
QSRRACPR RESTORE OBJECT AUTHORIZATIONS CPP
QSRREQIO S/R REQUEST I/O
QSRRLCPR RESTORE LIBRARY CPP
QSRRLCP2 RESTORE LIBRARY MAINLINE CODE
QSRROCPR RESTORE OBJECT CPP
QSRROCP2 RESTORE OBJECT MAINLINE CODE
QSRRSCUR FIND *SAVVOL FILE TO RESTORE FROM
QSRRSDEQ S/R RESTORE DEQUEUE PROCESSING
QSRRSFIL FIND SPECIFIED FILE TO RESTORE FROM
QSRRSLIB OBJECT VALIDATION DURING RESTORE
QSRRSOBJ OBJ TYPE SPECIFIC PROCESSING - RESTORE
QSRRSOPN OPEN FILE TO RESTORE FROM
QSRRSPST S/R RESTORE POST I/O PROCESSING
QSRRSRQI I/O MODULE FOR RESTORE
QSRRTVSF S/R RETRIEVE FROM SAVE FILE MODULE
QSRRUCPR RESTORE USER PROFILE CPP
QSRSAVO CBL INCLUDE FOR QSRSAVO
QSRSAVO QSRSAVO HEADER IN ILE/COBOL
QSRSAVO SAVE LIST OF OBJECTS API
QSRSAVO CSTATUS OT - RPG INCLUDE FOR QSRSAVO
QSRSAVO QSRSAVO HEADER IN ILE/RPG
QSRSLCPR SAVE LIBRARY CPP
QSRSLCP2 SAVE LIBRARY MAINLINE CODE
QSRSOCPR SAVE OBJECT & SAVE CHANGED OBJECT CPP
QSRSOCP2 SAVE OBJECT & SAVE CHGD OBJ MAINLINE
QSRSVCHK CHECK OBJECTS TO BE SAVED
QSRSVDEQ SAVE DEQUEUE PROCESSING MODULE
QSRSVEOV SAVE END OF VOLUME PROCESSING
QSRSVIOC SAVE DEVICE CONFIGURATION OBJECTS
QSRSVIPL SAVE THE INITIAL INSTALLATION OBJECTS
QSRSVPRE SAVE PRE-IO PROCESSING
QSRSVPST SAVE POST-IO PROCESSING
QSRSVRQI I/O MODULE FOR SAVE
QSRSVSFD S/R SAVE SAVE FILE DATA CPP
QSRSVUPR SAVE USER PROFILE OBJECTS
QSRTGTRS TARGET RELEASE FUNCTION
QSRTUNE SAVE/RESTORE PERFORMANCE TUNING
QSTCMADL ADD DELIMETERS TO ALT FILE NAME
QSTCMGFO LIST FILE OBJECTS
QSTCMRDL REMOVE DELIMITERS FROM NAME
QSTCMVOA VALIDATE ALTERNATE FILE NAME
QSTLJLKI LIST JOB LOCKS FOR STARVIEW
QSTRJOBI RETRIEVE JOB INFORMATION-SQL INFORMATION
QSUACHLC ADD S/370 CHANNEL CABLES
QSUADDRC ADD FILLER PANELS TO SYS CONFIGURATION
QSUADOEM IMA ADD OEM ENTRY TO SYS CONFIGURATION
QSUASGID IMA ASSIGN ELEMENT IDENTIFIER
QSUCHKOB CHECK EDF INTERNAL OBJECTS
QSUCNVRT CONVERT TOPOLOGY TO CURRENT REL FORMAT
QSUCNV01 FIX TOPOLOGY FOR CARD CAGES
QSUCNV02 FIX EIA,DEVICE POSITION,PARENT 9336
QSUCNV03 CHANGE 5031 TO 5030 IN REPORTED TYPE
QSUCPYDT COPY EDT DATA TO OBJECT
QSUCPYRC COPY SYS CONFIGURATION FILE
QSUCRLTE CORRELATE NEW TOPOLOGY WITH VPD
QSUDCHLC DISPLAY S/370 CHANNEL CABLES
QSUDSPCL IMA DISPLAY CABLE LIST
QSUDSPLE DISPLAY SYSTEM CONFIGURATION - LEO
QSUDSPRC IMA DISPLAY SYS CONFIGURATION
QSUDTMLS IMA AUTOMATIC LOAD SOURCE UPDATE
QSUGETK GET EDT RECORDS
QSUIMAMN IMA WORK WITH SYS CONFIGURATION
QSUINDRC IMA INDICATE SYS CONFIGURATION ITEM
QSUMOVLP IMA MOVE LIST POINTER
QSUPRCDB PROCESS SRM DATA BASE
QSUPRORC IMA PROCESS SYS CONFIGURATION CHANGE
QSUPRTRC PRINT SYS CONFIGURATION
QSUPUT PUT AN EDT RECORD
QSURCVRC SU RECEIVE INITIAL TOPOLOGY DATA
QSUUEXIT IMA EXIT MODULE
QSUUPDAU IMA AUTOMATIC CONFIGURATION UPDATE
QSUUPDCR IMA AUTOMATIC UPDATE OF CARDS
QSUUPDDV IMA AUTOMATIC DEVICE UPDATE
QSUUPDTS UPDATE TOPOLOGY TIMESTAMP
QSUWHPCP WORK WITH HW PRODUCTS CPP
QSWABAND QSWABAND: DROP A SWITCHED CONNECTION
QSWALLOC QSWALLOC: SWITCHED LINE LUD ALLOCATE
QSWANSWR QSWANSWR: MANUAL ANSWER CPP
QSWCDCPP STP/RSM-CTLRCY COMMAND CPP
QSWCDCR CD CONTACT UNSUCCESSFUL EVENT MODULE
QSWCDCRH QSWCDCRH: CD CONTACT REPLY HANDLER
QSWCDFR CD FAILURE EVENT PROCESSOR
QSWCDFRH CD FAILURE MSG REPLY HANDLER
QSWCDLST QSWCDLST: CD LOST CONTACT PROCESSOR
QSWCDMAN CD MANUAL INTERVENTION EVENT PROCESSOR
QSWCDMRH CD MANUAL INTERVENTION MSG HANDLER
QSWCDNAV QSWCDNAV: CD UNAVAILABLE PROCESSOR
QSWCDPRV QSWCDPRV: CD PROTOCOL VIOLATION
QSWCDSEL CD DIAL - ND SELECT EVENT HANDLER
QSWCDSTO CD SSCP TAKEOVER EVENT HANDLER
QSWCDSUC QSWCDSUC: CD CONTACT SUCCESSFUL
QSWCNSC CNOS REQIO COMPLETE HANDLER
QSWCPFEV QSWCPFEV: SW CPF EVENT ROUTER
QSWCUDEV QSWCUDEV: SW CD EVENT ROUTER
QSWDAMGE QSWDAMGE: PARTIAL OBJECT DAMAGE
QSWDIAL QSWDIAL: DIAL A REMOTE SWITCHED CD
QSWDISC QSWDISC: DISCONNECTING CPF EVENT
QSWDLTLD QSWDLTLD: DELETE LUD ENTRY IN CD ASP
QSWHRCMN HLD/RLS CMN DEVICE CPP
QSWIDLES PEER LUD IDLE SESSIONS EVENT HANDLER
QSWILCS PEER LUD CONTACT SUCCESSFUL - QLUS
QSWILUSM PEER LUD IMPL-TIME PROCESSOR
QSWINTQ QSWINTQ: INITIALIZE SW MESSAGE QUEUE
QSWINTSP QSWINTSP: INITIALIZE CD ASP
QSWIOCMP SW/QLUS REQIO COMPLETE HANDLER
QSWIVOFF PEER LUD VARY OFF MODULE - QLUS
QSWIVON PEER LUD VARY ON PROCESSOR - QLUS
QSWLCH1 PEER LUD EVENT ROUTER - VARY, CONTACT
QSWLCH2 PEER LUD EVENT ROUTER - CREATE, DELETE
QSWLDCPP STP/RSM-DEVRCY COMMAND CPP
QSWLDCR LUD CONTACT UNSUCCESSFUL EVENT HANDLER
QSWLDEV LUD EVENT HANDLER
QSWLDFR FAIL DEVICE EVENT HANDLER
QSWLDFRH RECOVER DEVICE
QSWLDOSE LUD OPEN SIOM ERROR EVENT HANDLER
QSWLDSNA LUD SNA PASSTHROUGH EVENT HANDLER
QSWLDSUC LUD CONTACT SUCCESSFUL EVENT HANDLER
QSWLD1SB LUD FIRST SESSION BOUND EVENT HANDLER
QSWLOCLD QSWLOCLD: LOCATE LUD ENTRY IN CD ASP
QSWLSH1 QLUS CNOS-REQUIRED EVENT HANDLER
QSWMCH APPN MODE CONTACT HANDLER
QSWNDABC ND ABANDON CALL MODULE
QSWNDCPP STP/RSM-LINRCY COMMAND CPP
QSWNDCR ND CONTACT UNSUCCESSFUL EVENT HANDLER
QSWNDCRH ND CONTACT UNSUCC MESSAGE REPLY HANDLER
QSWNDEV QSWNDEV: ND EVENT ROUTER
QSWNDFR LINE FAILURE EVENT PROCESSOR
QSWNDFRH LINE FAILURE MSG REPLY HANDLER
QSWNDIAL SW ND DIAL MODULE
QSWNDISC QSWNDISC: NON-DISCONNECTING CPF EVENT
QSWNDMAN ND MANUAL INTERVENTION EVENT HANDLER
QSWNDMRH SW ND MESSAGE REPLY HANDLER

QSWNDNOR QSWNDNOR: ND NO RECOVERY EVENT HANDLER
QSWNDSUC QSWNDSUC: ND CONTACT SUCCESSFUL
QSWNOSES PEER CD NO-SESSIONS EVENT HANDLER
QSWNWEV NETWORK EVENT HANDLER
QSWPDLSM PEER LUD POWER DOWN MONITOR PROCESSOR
QSWPGCPP END/RESUME PORT GROUP RECOVERY CPP
QSWPGEV PORT GROUP EVENT HANDLER
QSWPGFR PG FAILURE EVENT HANDLER
QSWPGFRH PG FAILURE REPLY HANDLER
QSWPGNOR PG NO RECOVERY NECESSARY EVENT HANDLER
QSWREPLY QSWREPLY: OPERATOR REPLY HANDLER
QSWRWKSL SW PAR ROUTINE
QSWSALC CNOS SOURCE SIDE ALLOCATE CONVERSATION
QSWSALCC CNOS ALLOCATE CONVERSATION COMPLETE
QSWSEMCP STRMOD/ENDMOD/CHGSSNMAX CPP
QSWSNDMS SW CD/ND FAILURE MSG SENDER
QSWSRCVC CNOS SOURCE SIDE RECEIVE COMPLETE
QSWSVDEA QSWSVDEA: SERVER DE-ACTIVATE SUCCESSFUL
QSWSVEV SERVER EVENT HANDLER
QSWSVFR SERVER FAILURE EVENT HANDLER
QSWSVSUC QSWSVSUC: SERVER ACTIVATE SUCCESSFUL
QSWSWERP SW/QLUS ERROR HANDLING MODULE
QSWTALC CNOS TARGET SIDE PROCESSOR
QSWTALCC TARGET SIDE CNOS XMIT COMPLETE
QSWUIMDP SWITCHED LINES PAR
QSWUNUSE QSWUNUSE: MARK CD UNSUSABLE
QSWXCDPC X25 CD PENDING CONTACT EVENT HANDLER
QSWXCOR X25 CALL OUT REQUEST REJECTED
QSXADDLS ADD LIST ENTRY TO UIM LIST
QSXCGETV EXTRACT SYSTEM VPD FOR API C FUNCTION
QSXCHGPB CHANGE PROBLEM CPP
QSXCHGPO CHANGE PROBLEM PROMPT OVERRIDE
QSXCLNUP CLOSE AND CLEAN UP ANY OPEN FILES
QSXCRTAR CREATE ASSOC RECORD FILES
QSXCRTPB CREATE PROBLEM RECORD FILE
QSXDLTPB DELTE PROBLEM AND ASSOC RECORDS
QSXDLTPS DELETE SINGLE PROBLEM LOG ENTRY
QSXDSPD DISPLAY PROBLEM DETAIL
QSXDSPD2 DISPLAY PROBLEM DETAILS UIM CALL PROGRAM
QSXDSPP DISPLAY PROBLEMS
QSXFAPAE COMMAND PROCESSOR FOR THE ADDPRBACNE CMD
QSXFCAPX PROMPTER EXIT FOR THE CHGPRBACNE COMMAND
QSXFCPAE COMMAND PROCESSOR FOR THE CHGPRBACNE CMD
QSXFIEXT SX FILTERING I EXIT PGM
QSXFLTR FILTERING AND PERFORMING ACTIONS
QSXFTRPB FILTER PROBLEM API
QSXFTRPB QSXFTRPB HEADER IN ILE/COBOL
QSXFTRPB QSXFTRPB API HEADER FOR CBL
QSXFTRPB QSXFTRPB API HEADER IN RPG
QSXFTRPB QSXFTRPB HEADER IN ILE/RPG
QSXFVASE VALIDATION ROUTINE FOR ADDPRBSLTE
QSXFVCSE VALIDATION ROUTINE FOR CHGPRBSLTE
QSXGETPB GET PROBLEM RECORD (USING QUERY)
QSXINEXT COMPONENT EXIT ROUTINE FOR SAVE/RESTORE
QSXISOPB ISOLATE PROBLEM
QSXLSACT EXIT PROGRAM FOR UIM LIST ACTION
QSXOPEN OPEN THE PROBLEM RECORD FILE
QSXPRTD PRINT PROBLEM DETAILS
QSXPRTL PRINT PROBLEM LIST
QSXPRTPB PRINT PROBLEM
QSXPTFAL EXIT PROGRAM FOR PTF LIST ACTION
QSXQRYAR QUERY THE PROBLEM REOCRD FILE
QSXQRYPB QUERY THE PROBLEM RECORD FILE
QSXQUERY QUERY PROBLEM LOG FILE
QSXRMCLN CLEAN UP FOR REMOTE SERVICES
QSXRMTL REMOTE SERVICES LOCAL MODULE
QSXRMTR1 REMOTE SERVICES REMOTE MODULE 1
QSXRMTR2 REMOTE SERVICES REMOTE MODULE 2
QSXRTVPD RETRIEVE PROBLEM DESCRIPTION
QSXSRVPL QSXSRVPL HEADER IN ILE/COBOL
QSXSRVPL QSXSRVPL HEADER IN ILE/RPG
QSXTXTAL EXIT PROGRAM FOR TEXT LIST ACTION
QSXUPDPB UPDATE THE PROBLEM RECORD FILE
QSXVLDSP VALIDATE DISPLAY PROBLEMS PARAMETERS
QSXVLDWP VALIDATE WORK WITH PROBLEMS PARAMETERS
QSXWRKP WORK WITH PROBLEM LOG CPP
QSXWRKP1 WORK WITH A PROBLEM
QSXWRKTX WORK WITH PROBLEM TEXT
QSXWRKT1 WORK WITH PROBLEM TEXT
QSY QSY HEADER IN ILE/COBOL
QSY QSY API HEADER FOR CBL
QSY QSY API HEADER IN RPG
QSY QSY HEADER IN ILE/RPG
QSYACCIP ACCESS INTERACTIVE PROFILE FUNCTIONS
QSYADDAL ADD AUTHORIZATION LIST ENTRY
QSYAULIB RETRIEVE AUTHORIZED LIBRARY LIST
QSYAUTEV SYSTEM AUTHORIZATION EVENT HANDLER
QSYCAUDR CHECK IF AUDIT SHOULD OCCUR
QSYCGOBA CPP FOR CHGOBJAUD
QSYCGURA CPP FOR CHGUSRAUD
QSYCHGAL CHANGE AUTHORIZATION LIST ENTRY
QSYCHGIP CHANGE INTERACTIVE PROFILE ENTRY
QSYCHGMP CHANGE MSF SECURITY OFFICER PASSWORD
QSYCHGPR CHANGE PREVIOUS SIGN-ON DATE API
QSYCHGPW CHANGE USER PASSWORD API
QSYCHGSP CHANGE SECURITY OFFICER PASSWORD
QSYCHKIT CHECK OBJECT INTEGRITY CPP
QSYCHONR CHANGE OBJECT OWNER CPP
QSYCHPRF CPP FOR CHGPRF COMMAND
QSYCKCMD CHECK COMMAND AUTHORITY FOR DISPLAYS
QSYCKSCV CHECK SECURITY VALUES MODULE
QSYCNV CONVERT SYMBOLIC OBJECT AUTHORITY
QSYCPYIP COPY INTERACTIVE PROFILE
QSYCPYUP PGM FOR CPYUSRPRF WITH VALUES
QSYCRHLR CREATE AUTHORITY HOLDER CPP
QSYCRTAL CREATE AUTHORIZATION LIST CPP
QSYCRTIP CREATE INTERACTIVE PROFILE
QSYCUSRA CHECK USER AUTHORITY API
QSYCUSRS CHECK USER SPECIAL AUTHORITY API
QSYCVTA CONVERT TO MI AUTHORITY API
QSYDALO DISPLAY AUTH LIST OBJECTS MODULE
QSYDLHLR DELETE AUTHORITY HOLDER CPP
QSYDLTAL DELETE AUTHORIZATION LIST CPP
QSYDLUP DELETE USER PROFILE CPP
QSYDSAUT DISPLAY OBJECT AUTHORITY CPP
QSYDSHLR DISPLAY AUTHORITY HOLDERS CPP
QSYDSUP DISPLAY USER PROFILE CPP
QSYDSUSR DISPLAY AUTHORIZED USERS CPP
QSYEDAUT EDIT OBJECT AUTHORITY CPP
QSYENCPW ENCRYPT USER PASSWORD
QSYEVAUT EVENT HNDLR FOR QSYGRAUT AND QSYRVAUT
QSYEVTAF EVENT HANDLER FOR VMC AUDIT FAILURE
QSYEVTLK EVENT HANDLER FOR QAUDJRN LOCKING
QSYEVTL2 TIMER EVENT HANDLER FOR QAUDJRN LOCK
QSYEVTNT TIMER EVENT HANDLER FOR *NOTIFY
QSYEVTN2 TIMER EVENT HANDLER FOR *NOTIFY
QSYEXGRM EXTRACT GROUP MEMBERS CPP
QSYEXTHD EXTUPI OF HOME DIR FOR C SPI "QSYGETHD"
QSYEXTSL EXTRACT SYSTEM SECURITY LEVEL
QSYEXUNP EXTRACT USER NAME AND PASSWORD
QSYFIXPR GRANT PRIVATE AUTHORITY TO *PRV COMMANDS
QSYFIXUP GRANT PRIVATE AUTHORITY TO QSYS38 CMDS
QSYFIX2 ADD NEW AUTS TO PROFILES AND OBJECTS
QSYGETPH GET PROFILEHANDLE API
QSYGRAUT GRANT OBJECT AUTHORITY CPP
QSYGRHLR GRANT TO OBJECT ITS AUTHORITY HOLDER
QSYGRSME GRANT SAME AUTHORITY TO EXTERNAL OBJ
QSYGRTSA GRANT SAME AUTHORITY PROCEDURE
QSYGRUSR GRANT USER AUTHORITY
QSYHNAUT AUTHORITY EXCEP HANDLER / EXT INIT PGM
QSYIEXIT QSYIEXIT - GENERIC INVOCATION EXIT
QSYINT1 FUNCTIONS FOR INSTALL TYPE 1
QSYINT2 FUNCTIONS FOR INSTALL TYPE 2
QSYJRNLK QAUDJRN JOURNAL LOCKING MODULE
QSYLATLO API TO LIST OBJECTS SECURED BY AUTH LIST
QSYLATLO LIST OBJECTS SECURED BY AUTL
QSYLATLO QSYLATLO HEADER IN ILE/COBOL
QSYLATLO LIST OBJECTS SECURED BY AUTL
QSYLATLO QSYLATLO HEADER IN ILE/RPG
QSYLAUTU API TO LIST AUTHORIZED USERS

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QSYLAUTU  LIST AUTHORIZED USERS
QSYLAUTU  QSYLAUTU HEADER IN ILE/COBOL
QSYLAUTU  LIST AUTHORIZED USERS
QSYLAUTU  QSYLAUTU HEADER IN ILE/RPG
QSYLIBAU  SEND LIB AUDIT ENTRY FROM SYAUDDLT
QSYLOBJA  API TO LIST OBJECTS USER HAS AUT TO/OWNS
QSYLOBJA  LIST OBJECTS USER AUT/OWN/PG
QSYLOBJA  QSYLOBJA HEADER IN ILE/COBOL
QSYLOBJA  LIST OBJECTS USER AUT/OWN/PG
QSYLOBJA  QSYLOBJA HEADER IN ILE/RPG
QSYLOBJP  API TO LIST OBJECTS ADOPTING USER AUTH
QSYLOBJP  LIST OBJECTS THAT ADOPT AUTH
QSYLOBJP  QSYLOBJP HEADER IN ILE/COBOL
QSYLOBJP  LIST OBJECTS THAT ADOPT AUTH
QSYLOBJP  QSYLOBJP HEADER IN ILE/RPG
QSYLUSRA  API TO LIST USERS AUTHORIZED TO OBJECT
QSYLUSRA  LIST USERS AUTHORIZED TO OBJ
QSYLUSRA  QSYLUSRA HEADER IN ILE/COBOL
QSYLUSRA  LIST USERS AUTHORIZED TO OBJ
QSYLUSRA  QSYLUSRA HEADER IN ILE/RPG
QSYMDSPC  MODIFY SPECIAL AUTHORITIES AT IMPL
QSYPGMAD  DISPLAY PROGRAMS THAT ADOPT
QSYPGMCH  CHECK PROGRAM FOR ADOPTED PROFILE
QSYPRPOP  PROMPTER OVERRIDE FOR CHGPRF CHGUSRPRF
QSYPWDCR  PASSWORD COMPOSITION RULES CPP
QSYRAUTL  RECLAIM OBJECTS WITH DESTROYED AUTL
QSYRCATL  RECLAIM HANDLER FOR AUTHORIZATION LIST
QSYRCHLR  RECLAIM AUTHORITY HOLDERS MODULE
QSYRLSPH  RELEASE PROFILEHANDLE API
QSYRMAIP  REMOVE INTERACTIVE PROFILE ENTRY
QSYRMVAL  REMOVE AUTHORIZATION LIST ENTRY CPP
QSYRMVIP  REMOVE INTERACTIVE PROFILE ENTRY
QSYRSAUT  RESTORE AUTHORIZED USER TABLE
QSYRTVAL  RETRIEVE AUTHORIZATION LIST ENTRY
QSYRTVEP  RETRIEVE USERS ENCRYPTED PASSWORD
QSYRTVIP  RETRIEVE INTERACTIVE PROFILE ENTRY
QSYRTVUP  RETRIEVE USER PROFILE CPP
QSYRUSRA  QSYRUSRA HEADER IN ILE/COBOL
QSYRUSRA  RETRIEVE USER AUT TO OBJ
QSYRUSRA  RETRIEVE USER AUTHORITY API
QSYRUSRA  QSYRUSRA HEADER IN ILE/RPG
QSYRUSRA  RETRIEVE USER AUT TO OBJECT
QSYRUSRI  RETRIEVE INFO ABOUT USER
QSYRUSRI  RETRIEVE USER INFORMATION API
QSYRUSRI  RETRIEVE INFO ABOUT USER
QSYRVATL  REVOKE AUTH LIST IF PUBLIC IS *AUTL
QSYRVAUT  REVOKE OBJECT AUTHORITY CPP
QSYSAUDR  SEND AUDIT RECORD
QSYSGNON  HANDLE SIGN ON PROCESSING
QSYSMPVE  SIGNAL MSG FOR PARM VALIDATION ERRORS
QSYSVAUT  SAVE AUTHORIZED USER TABLE
QSYUP     CREATE/CHANGE USER PROFILE CPP
QSYUPASR  USER PROFILE ASSOICATED SPACE RECOVERY
QSYUPAUT  RESOLVE TO AUTHORIZED USER TABLE
QSYUPSIZ  RETRIEVE TOTAL SIZE OF USER PROFILE
QSYUUID1  UUID GEN MODULE
QSYVERFY  VERIFY SYSTEM ENTRY AUTHORITY
QSYVFCHP  VERIFY/CHANGE DOCUMENT PASSWORD
QSYWRKOW  WORK WITH OWNED OBJECTS FOR USER PROFILE
QSYWRKO1  WRKOWNOBJ CHANGE OBJECT OWNER ROUTINE
QSYWRKPG  WORK WITH PRIMARY GROUP OBJS FOR USRPRF
QSYWRKP1  WRKOBJPGP PROCESS OPTIONS MODULE
QSZBLDIX  BUILD ENTRIES FOR *PRDAVLI INDEX
QSZCHKPO  CHECK PRODUCT OPTION - CHKPRDOPT
QSZCIEXT  IEXIT PROGRAM FOR QSZCPDO & QSZCPLO
QSZCNLCG  BUILD LIST OF SOFTWARE PRODUCT DATA
QSZCPDO   CREATE PRODUCT DEFN OBJECT - CRTPDO CPP
QSZCPFID  CHANGE MRI PRODUCT FUNCTION ID
QSZCPLO   CREATE PRODUCT LOAD OBJECT - CRTPLO CPP
QSZCRTDF  PROGRAM TO CREATE PRODUCT DEFINITION
QSZCRTOP  PROGRAM TO CREATE PRODUCT OPTION/LOAD
QSZCRTPD  CREATE PRODUCT DEFINITION API: CRTPRDDFN
QSZCRTPD  QSZCRTPD HEADER IN ILE/COBOL
QSZCRTPD  QSZCRTPD API HEADER FOR CBL
QSZCRTPD  QSZCRTPD API HEADER IN RPG
QSZCRTPD  QSZCRTPD HEADER IN ILE/RPG
QSZCRTPL  CREATE PRODUCT LOAD API: CRTPRDLOD
QSZCRTPL  QSZCRTPL HEADER IN ILE/COBOL
QSZCRTPL  QSZCRTPL API HEADER FOR CBL
QSZCRTPL  QSZCRTPL API HEADER IN RPG
QSZCRTPL  QSZCRTPL HEADER IN ILE/RPG
QSZDLTPD  SZ DELETE PRODUCT DEF
QSZDLTPL  SZ DELETE PRODUCT LOAD
QSZEXPRD  SZ PRODUCT INFORMATION IEXIT
QSZGTPRD  GET PRODUCT INFORMATION
QSZIPL    SZ IPL ROUTINE
QSZLKPRD  CHECK PRDAVL LOCK BEFORE ALLOWING UPDATE
QSZPDDCR  *PRDAVL RECOVERY MODULE
QSZPDOUP  PRODUCT DEFINITION UPDATE ROUTINE
QSZPKG    PACKAGE PRODUCT OPTION
QSZPKGPO  PACKAGE PRODUCT OPTION - PKGPRDOPT API
QSZPKGPO  QSZPKGPO HEADER IN ILE/COBOL
QSZPKGPO  QSZPKGPO API HEADER FOR CBL
QSZPKGPO  QSZPKGPO API HEADER IN RPG
QSZPKGPO  QSZPKGPO HEADER IN ILE/RPG
QSZPREXB  PROMPT PROGRAM FOR INSTLD & SUPPTD PRODU
QSZPREXI  PROMPT PROGRAM FOR INSTALLED PRODUCTS
QSZRECOV  PRODUCT DIRECTORY RECOVERY
QSZRTVPD  PROCESSING MODULE FOR SZRTVPD MACRO
QSZRTVPR  QSZRTVPR HEADER IN ILE/COBOL
QSZRTVPR  QSZRTVPR API HEADER FOR CBL
QSZRTVPR  RETRIEVE PRODUCT INFORMATION API
QSZRTVPR  QSZRTVPR API HEADER IN RPG
QSZRTVPR  QSZRTVPR HEADER IN ILE/RPG
QSZSLTPR  QSZSLTPR API HEAD  ILE/COBOL
QSZSLTPR  QSZSLTPR API HEADER FOR CBL
QSZSLTPR  SZ SELECT PRODUCT API
QSZSLTPR  QSZSLTPR API HEADER IN RPG
QSZSLTPR  QSZSLTPR HEADER IN ILE/RPG
QSZSPREX  SZSLTPR COMMAND EXIT PROGRAM
QSZSTPRD  STORE PRODUCT SUPPORT INFORMATION
QS2CRMUT  CM BRIDGE SNADS FS2 RCV PARSE TABLE INIT
QS2CSMUT  CM BRIDGE SNADS FS2 SND PARSE TABLE INIT
QS2DSTIX  CM BRIDGE DISTRIBUTE IEXIT MODULE_
QS2LSTPR  SNADS S2 SEND DISTRIBUTION FUNCTION
QS2RCVDS  SNADS S2 SEND DISTRIBUTION FUNCTION
QS2RCVIX  CM BRIDGE SNADS FS2 MU RECEIVER IEXIT
QS2RCVR   CM BRIDGE SNADS FS2 MU RECEIVER
QS2RCVSC  SNADS S2 SEND DISTRIBUTION FUNCTION
QS2RSVID  SNADS S2 RESERVE ID FUNCTION
QS2SCHGR  RGSTRY - S2SIASN/S2SICHG MACRO SUPP
QS2SCMUQ  CMUQ - S2SCGET & S2SCPUT MACRO SUPP
QS2SCREP  S2 SHELL UNIT REPORT CREATION
QS2SCRID  SNADS S2 SEND DISTRIBUTION FUNCTION
QS2SDELT  RGSTRY - S2SIDELT MACRO SUPP
QS2SENDR  CM BRIDGE SNADS FS2 MU SENDER
QS2SFINR  RGSTRY - S2SIFMU/S2SIFGT MACRO SUPP
QS2SIEXT  S2 MODULE QS2SRSEQ IEXIT MODULE
QS2SNDDS  SNADS S2 SEND DISTRIBUTION FUNCTION
QS2SNDSC  SNADS S2 SEND DISTRIBUTION FUNCTION
QS2SNPLD  LOCAL DELIVERY SNAP-IN FOR SNADS CM
QS2SNPMF  MESSAGE FORWARDING SNAP-IN FOR SNADS CM
QS2SNPND  NON-DELIVERY SNAP-IN FOR SNADS CM
QS2SRINT  RGSTRY - S2SIINIT RCVREG MACRO SUPP
QS2SRSEQ  SEQ # - S2SSGSEQ & S2SSRSEQ MACRO SUPP
QS2SRSET  RGSTRY - S2SIQURY & S2SIRSET MACRO SUPP
QS2SSINT  RGSTRY - S2SIINIT SNDREG MACRO SUPP
QS2STSIX  SNADS SENDER START MODULE IEXIT
QS2STSND  CM BRIDGE START SNADS FS2 MU SENDER
QTAADD    TAPE FM ADDTAPCTG COMMAND PROCESSING PGM
QTACDENS  TAPE DENSITY CHOICES PROGRAM
QTACGYCH  CHOICES FOR CGY PARM
QTACHECK  QTACHECK
QTACHOIC  CHOICES FOR DENSITY & TODENSITY PARM
QTACLOSE  CLOSE TAPE DEVICE FILE
QTACMLB   TAPE FM CRTDEVMLB CPP
QTACRTC   TAPE FM CRTTAPCGY CPP
QTACVOL   TAPE FM CHGTAPVOLA CPP
QTADENS   TAPE DENSITY CONVERSION PROGRAM
QTADEVCH  CHOICES FOR LIBRARY DEV PARM
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QTADLTC TAPE FM DLTTAPCGY CPP
QTADMLB TAPE FM DLTDEVMLB CPP
QTADMPIO DUMP I/O MODULE
QTADMT TAPE FM DEMOUNT TAPE CARTRIDGE PROGRAM
QTADSPC DISPLAY TAPE CATEGORY CPP
QTADSPY DISPLAY TAPE CPP
QTADUMP DUMP TAPE COMMAND PROCESSOR - DMPTAP
QTADUP DUPLICATE TAPE CPP
QTADUPVC DUPTAP TODENSITY VALIDITY CHECKER
QTADVOL TAPE FM DSPTAPVOLA CPP
QTAEOV TAPE END-OF-VOLUME PROCESSOR
QTAERR TAPE ERROR HANDLER/MESSAGE ROUTER
QTAERRIN TAPE ERROR TABLE INITIALIZATION
QTAEVMON DEVICE EVENT HANDLER
QTAFEOD TAPE FORCE END OF DATA
QTAFEOV TAPE FORCE END OF VOLUME
QTAGET TAPE RECORD GET
QTAINFO TAPE FM DSPTAPSTS CPP
QTAINIT INZTAP COMMAND PROCESSING PROGRAM
QTAINST TAPE FM MSE INSTALL PROGRAM
QTAINZVC INZTAP DENSITY VALIDITY CHECKER
QTAIXMGR TAPE INDEX MANAGER
QTALUDIN TAPE LUD INITIALIZTION
QTALVMGR TAPE FM LIBRARY MANAGER
QTAMLD TAPE FM MLD COMMAND EXECUTOR
QTAMNT TAPE FM MOUNT TAPE CARTRIDGE PROGRAM
QTAOPCHK TAPE FILE OPEN PARAMETER CHECKING
QTAOPEN TAPE DEVICE FILE OPEN
QTAPUT TAPE RECORD PUT
QTARBD TAPE FM RBDTAPIDX CPP
QTARMV TAPE FM RMVTAPCTG COMMAND PROCESSING PGM
QTASX400 TAPE FM SX/400 SIDELINE STORAGE HANDLER
QTASYSCH CHOICES FOR CGYSYS PARM
QTATAPCH CHOICES FOR TAPE DRIVES IN CONFIG LIBS
QTATAPEX TAPE MANAGEMENT GATEWAY IN QMSE__
QTAUSREX USER PROGRAM EXIT
QTAUSRLB USER LABEL SUPPORT
QTAVCLOS TAPE VOLUME CLOSE
QTAVDENS TAPE DENSITY CHOICES PROGRAM
QTAVOPEN QTAVOPEN - VOLUME OPEN
QTAWINFO WORK WITH TAPE STATUS CPP
QTAWVOL TAPE FM WRKTAPVOL CPP
QTBAECHS ASCII-EBCDIC SIMPLIFIED CHINESE
QTBAECHT ASCII-EBCDIC TRADITIONAL CHINESE
QTBAEJPN ASCII-EBCDIC JAPANESE TRANSLATION
QTBAEKOR ASCII-EBCDIC KOREAN TRANSLATION
QTBCCLST CCSID PROMPT BUILDER
QTBCONST GET CCSID FOR CONSTANT
QTBCRTBL CREATE TABLE
QTBDSPTB DISPLAY TABLE
QTBEACHS EBCDIC-ASCII SIMPLIFIED CHINESE
QTBEACHT EBCDIC-ASCII TRADITIONAL CHINESE
QTBEAJPN EBCDIC-ASCII JAPANESE TRANSLATION
QTBEAKOR EBCDIC-ASCII KOREAN TRANSLATION
QTBEXIT TB INSTALL EXIT CODE
QTBMXSBX SUPPORT CONVERSION BETWEEN SBCS & MBCS
QTBMXTMX MIXED EBCDIC TO MIXED EBCDIC
QTBPOSTO POSITION TO PROGRAM
QTBSBDBX DBCS TRANSLATE MODULE
QTBTBLMG TRANSLATION TABLE MANAGER
QTBXLATE TRANSLATE FUNCTION
QTEADDVD ADD_VIEW_DESCRIPTION API
QTEADDVF START_VIEW_FILE API
QTEADDVM ADD_VIEW_MAP API
QTEADDVT ADD_VIEW_TEXT API
QTEBRKWK CALLED BY UIM
QTECADBP ADD BREAKPOINT CPP
QTECADPG ADD PROGRAM CPP
QTECADTR ADD TRACE CPP
QTECCHDB CHANGE DEBUG CPP
QTECCHHP CHANGE HLL POINTER CPP
QTECCHPT CHANGE POINTER CPP
QTECCHVR CHANGE PROGRAM VARIABLE CPP
QTECCLTD CLEAR TRACE DATA CPP
QTECCNRQ CANCEL REQUEST CPP
QTECDSBP DISPLAY BREAKPOINT CPP
QTECDSDB DISPLAY DEBUG CPP
QTECDSTD DISPLAY TRACE DATA CPP
QTECDSTR DISPLAY TRACE CPP
QTECDSVR DISPLAY PROGRAM VARIABLE CPP
QTECENDB END DEBUG MODE CPP
QTECNTDB ENTER DEBUG MODE CPP
QTECRMBP REMOVE BREAKPOINT CPP
QTECRMPG REMOVE PROGRAM CPP
QTECRMTR REMOVE TRACE CPP
QTECRSBP RESUME BREAKPOINT CPP
QTEDBINT INVOKE DEBUG INTERPRETER
QTEDMPV QTEDMPV HEADER IN ILE/COBOL
QTEDMPV QTEDMPV HEADER IN ILE/RPG
QTEDMPVB DUMPMODULEVARIABLE OPM API
QTEENDDB END_SOURCE_DEBUG API
QTEENDVC END_VIEW_CREATION API
QTEEVLWK CALLED BY UIM
QTEIRTVD GET DEBUG INFORMATION
QTEMADPG ADDPGM *SAME ELIMINATOR
QTEMAPST MAP_VIEW_STATEMENT SPI
QTEMBKCU BREAKPOINT CLEANUP MODULE
QTEMCHDB CHGDBG *SAME ELIMINATOR
QTEMDBSV PERFORM DEBUG SERVICE REQUEST
QTEMDEBP DEFAULT EXCEPTION BKP HDLR
QTEMDIAG PERFORM DIAG PRIVILEGED INSTRUCTION
QTEMEJCU END OF JOB CLEANUP MODULE
QTEMGTHL GET HLL STMT ID
QTEMGTVR GET PROGRAM VARIABLE
QTEMLOBJ LOCATE PROGRAM OBJECT
QTEMMEMW WRITE TO MEMORY AS A USER STATE PROGRAM
QTEMRBCN STUB MODULE
QTEMRBCU CLEANUP IF REMOTE BREAKPOINT IS CANCELED
QTEMRCLM RECLAIM RESOURCES MODULE
QTEMRLBP RELEASE SERVICED JOB FROM BREAKPOINT
QTEMRPDS REPLACE DEBUG DISPLAY WITH ANOTHER PGM
QTEMSJVC ENDSRVJOB VALIDITY CHECKER
QTEMVFOR VERIFY ODV LIST
QTEPGMWK CALLED BY UIM
QTEPLSWK CALLED BY UIM
QTERTVPV QTERTVPV HEADER IN ILE/COBOL
QTERTVPV QTERTVPV API HEADER FOR CBL
QTERTVPV RETRIEVE PROGRAM VARIABLE API
QTERTVPV QTERTVPV API HEADER IN RPG
QTERTVPV QTERTVPV HEADER IN ILE/RPG
QTESESSH DEBUG SESSION HANDLER
QTESTOPH DEBUG STOP HANDLER
QTESTRVC START_VIEW_CREATION API
QTESYFMT SYMBOL TABLE IMAGE FORMATTER
QTESYSAV SYMBOL TABLE IMAGE FILE CREATION
QTEVIREF INSTRUCTION REFERENCE EVENT HANDLER
QTEVRLJQ SERVICED JOB RELEASED FROM JOB Q HANDLER
QTEVSIRF EVENT HANDLER FOR DEBUGGED SERVICED JOB
QTEXADRS SYMBOL TABLE ADDRESS AND SIZE EXTRACTION
QTEXADRV ADDRESS PROCESS VIEW SPACE
QTEXAWCB ANCHOR SPCPTR IN WCB
QTEXCRTS CREATE SPACE
QTEXCRTV CREATE VIEW INITIALIZATION CODE
QTEXCWCB COPY SPCPTR FROM WCB
QTEXDBGI INVOKE DEBUG INTERPRETER
QTEXDDSH CALL USER SUPPLIED SESSION HANDLER
QTEXDESS DESTROY SPACE
QTEXDSTD DESTROY DEBUG DATA ANCHORED TO WCB
QTEXDWCB DELETE SPCPTR IN WCB
QTEXFMOD FIND MODULE DEBUG DATA
QTEXLPDD LIST PROGRAM DEBUG DATA
QTEXMMFD MODULE MGR I/F TO CREATE DEBUG DATA
QTEXMMI IMPLICIT PROGRAM PERMISSION ROUTINE
QTEXPPFD BINDER I/F TO CREATE DEBUG DATA
QTEXRMDD DSPMOD/CRTPGM I/F TO DEBUG DATA
QTEXRMVM REMOVE MODULE OBJECT DEBUG DATA
QTEXRMVP REMOVE PROGRAM OBJECT DEBUG DATA
QTEXRPDD DSPPGM I/F TO PROGRAM DEBUG DATA
QTEXRPLP RPLMOD I/F TO PROGRAM DEBUG DATA
QTEXRTSP I/F TO RETRIEVE STOPPED POSITION

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QTEXRTVS  I/F TO RETRIEVE STOPPED POSITION
QTEXSTOV  STORE VIEW SPACE TO FILE ASSOCIATED SPAC
QTEXUTIL  UTILITIES FOR SOURCE DEBUG API
QTEXVWIN  GET VIEW INFORMATION
QTICLNUP  CONNECT VAN - CLEANUP/IEXIT
QTICONCT  CONNECT VAN
QTIEXIT   END TIE ROUTINE
QTIHNPCS  CONNECT VAN - HNPC TRANSACTION PROC
QTIINQR1  INQUERY ROUTINE FOR TIE
QTIMAIN1  MAIN ROUTINE TO CALL TIE MODULES
QTIPARSE  PARSE CONNECT VAN DATASTREAMS
QTIRCV    TIE RECEIVE FILE MODULE
QTISEND1  SEND MODULE FOR TIE
QTNADDCR  ADD COMMITMENT RESOURCE API
QTNADDCR  QTNADDCR HEADER IN ILE/COBOL
QTNADDCR  QTNADDCR API HEADER FOR CBL
QTNADDCR  QTNADDCR API HEADER IN RPG
QTNADDCR  QTNADDCR HEADER IN ILE/RPG
QTNCHGCO  CHANGE COMMITMENT OPTIONS API
QTNCLOSE  CLOSE FILE UNDER COMMITMENT CONTROL
QTNCMT    COMMIT LOGICAL UNIT OF WORK CPP
QTNCMTEP  COMMIT LOGICAL UNIT OF WORK - EXTENDED
QTNCNLRS  DISPLAY -- CANCEL RESYNCHRONIZATION
QTNCRDAR  ADD OR REMOVE A CRD RESOURCE
QTNCRLBP  CALL ROLLBACK PROGRAM W/ADOPTED AUTH
QTNCTL    START COMMITMENT CONTROL CPP
QTNDFNBL  DISPLAY -- BUILD DEFINITION LIST
QTNDSPCD  DISPLAY -- BUILD COMMITMENT DEFINITION
QTNDSPCS  DISPLAY -- BUILD COMMIT STATUS
QTNDTCOB  DETACH COB AND END JOURNALING FOR IT
QTNECCID  EXTRACT CURRENT COMMIT CYCLE IDENTIFIER
QTNEND    END COMMITMENT CONTROL CPP
QTNENDAG  COMMITMENT CTL END ACTIVATION GROUP
QTNENDSV  SERVER JOB WATCHDOG FOR QTNEND COMPLETE
QTNEV1SV  HANDLE 8100 2304 RESCHEDULE RESYNC EVENT
QTNGETCD  DISPLAY -- GET A COMMITMENT DEFINITION
QTNHRD    DISPLAY -- INITIATE HEURISTIC DECISION
QTNHRDEH  HEURISTIC DECISION EVENT HANDLER
QTNIPL    COMMITMENT CONTROL IPL RECOVERY
QTNIPLSV  CMT CTL IPL/POST-IPL RECOVERY IN SRV JOB
QTNI4GET  IMPLIED FORGET
QTNLOG    EXCHANGE LOG NAMES
QTNMCDRI  MANAGE COMMIT DEFN RECOVERY INDEX
QTNNTFY   UPDATE NOTIFY OBJECT
QTNNTRS   VALIDATE NOTIFY OBJECT
QTNOPEN   OPEN FILE UNDER COMMITMENT CONTROL
QTNPREP   PREPARE FOR COMMIT
QTNPRINT  DISPLAY -- PRINT FUNCTION
QTNRBRQD  ROLLBACK REQUIRED API
QTNRCMTI  QTNRCMTI HEADER IN ILE/COBOL
QTNRCMTI  QTNRCMTI API HEADER FOR CBL
QTNRCMTI  RETRIEVE COMMIT INFORMATION API
QTNRCMTI  QTNRCMTI API HEADER IN RPG
QTNRCMTI  QTNRCMTI HEADER IN ILE/RPG
QTNRLBRQ  ROLLBACK REQUIRED
QTNRMVCR  REMOVE COMMITMENT RESOURCE API
QTNROLLB  ROLLBACK LOGICAL UNIT OF WORK CPP
QTNRSCBL  DISPLAY -- BUILD RESOURCE STATUS
QTNRSRSP  RESYNC RESPONSE
QTNRSYNC  USER-PROCESS RESYNC
QTNRSYSV  SERVER JOB RESYNC
QTNSAV    COMMITMENT CONTROL SAVE TIME PROCESSING
QTNSLTCV  DISPLAY -- SELECT A CONVERSATION
QTNSNDJE  SEND COMMIT-RELATED JOURNAL ENTRY
QTNTRACE  COMMITMENT CONTROL TRACE FUNCTIONS
QTNTREVT  RESYNC REPLY EVENT -8100 2303- HANDLER
QTNTRSYN  RESYNC TP PROCESSING
QTNT1EVT  PROCESS TERMINATION TIMER EVENT HANDLER
QTNT2EVT  IPL TIMER EVENT HANDLER
QTNUPAGA  UPDATE ACTIVATION GROUP ARRAY
QTNUQEVT  UNABLE TO QUIESCE EVENT HANDLER, SWA
QTNWRKCD  WORK WITH COMMITMENT DEFINITIONS CPP
QTOAABRT  TCPABORT STREAMS OPERATIONS
QTOAAPID  UN-MARK JOB IN-USE BY TCP/UDP API
QTOAAPIU  MARK JOB IN-USE BY TCP/UDP API
QTOACLS   TCPCLOSE STREAMS OPERATIONS
QTOACRTQ  CREATE QUEUE
QTOADELQ  DESTROY QUEUE
QTOADSPC  DELETE SPACE
QTOAEND   CLOSE A STREAM
QTOAENDJ  CLEAN UP IN ABNORMAL JOB TERMINATION
QTOAGHBN  GET HOST BY NAME
QTOAGTID  GET IDENTITY
QTOAISLA  IS LOCAL ADDRESS
QTOAISUP  CHECK IF TCP STACK IS UP
QTOAOPN   TCPOPEN PL/MI PART
QTOAPING  PINGREQUEST PL/MI SUPPORT
QTOAQRYD  QUERY HOST TABLE
QTOARCV   TCPRECEIVE STREAMS MACROS
QTOASND   TCPSEND STREAMS MACROS
QTOASTRM  API STREAM MESSAGE HANDLER
QTOASTT   TCPSTATUS PLMI
QTOATIME  DO TIMER STREAM OPERATIONS
QTOAUCLS  UDPCLOSE STREAMS OPERATIONS
QTOAUOPN  UDPOPEN STREAMS OPERATIONS
QTOAURCV  UDPRECEIVE STREAM OPERATIONS
QTOAUSND  UDPSEND STREAMS MACROS
QTOAUSTT  UDPSTATUS PLMI
QTOCAIFC  ADDXXXIFC CPP
QTOCAPCP  CFGTCPAPP CPP
QTOCAPOR  ADDTCPPORT CPP
QTOCARSI  ADDTCPRSI CPP
QTOCARTE  ADDXXXRTE CPP
QTOCATE   ADDXXXTBLE CPP
QTOCCAP   CHGTCPA CPP POP
QTOCCATR  CHGTCPA CPP
QTOCCFCP  CFGTCP CPP
QTOCCHT   CHGTCPHTE CPP
QTOCCIFC  CHGXXXIFC CPP
QTOCCRTE  CHGXXXRTE CPP
QTOCDCND  DC ND INTERFACE MODULE
QTOCDUPF  PGM FOR TCP OR IPS CLEANUP FOR DLTUSRPRF
QTOCEIFC  ENDTCPIFC CPP
QTOCETCP  ENDTCP CPP
QTOCETCT  ENDTCP CONTROLLED MODULE
QTOCGIXP  GENERAL INV EXIT PGM FOR TCP/IP MODULES
QTOCIX1   INVOCATION EXIT PGM FOR TBLE CPP PGMS
QTOCLDMD  CHANGE LOCAL DOMAIN NAME PANEL PGM
QTOCMHT   MRGTCPHT CPP
QTOCOPT   WRKXXXTBLE OPTION HANDLER
QTOCPIFC  CHGXXXIFC CPP POP
QTOCPING  PING/VFYTCPCNN CPP
QTOCPRTE  CHGXXXRTE CPP POP
QTOCRIFC  RMVXXXIFC CPP
QTOCRNHT  RNMTCPHTE CPP
QTOCRNME  CHANGE REMOTE NAME SERVER PANEL PGM
QTOCRPOR  RMVTCPPORT CPP
QTOCRRSI  RMVTCPRSI CPP
QTOCRRTE  RMVXXXRTE CPP
QTOCRTE   RMVXXXTBLE CPP
QTOCSIFC  STRTCPIFC CPP
QTOCSRV   STRTCPSVR/ENDTCPSVR CPP
QTOCSTCP  STRTCP CPP
QTOCSTIX  INVOCATION EXIT PGM FOR STRTCP & ENDTCP
QTOCTCIX  QTCPIP JOBS INVOCATION EXIT PROGRAM
QTOCTCPI  QTCPIP PERSISTENT JOB
QTOCUX1   UIM EXIT PGM FOR WRKXXXTBLE CPPS
QTOCVIFC  VALIDATE IFC EXTERNAL ROUTINE
QTOCVRSI  VERIFY RSI VALUES
QTOCVRTE  VALIDATE ROUTE EXTERNAL ROUTINE
QTOCWHTE  WORK WITH HOST TABLE ENTRIES
QTOCWHTO  WORK WITH HOST TABLE ENTRIES OPTIONS
QTOCWIFC  WORK WITH TCP/IP INTERFACES
QTOCWIFO  PROCESS INTERFACE OPTIONS FROM PANEL
QTOCWPOO  PROCESS IPS PORT OPTIONS FROM PANEL
QTOCWPOR  WORK WITH TCP/IP PORTS
QTOCWRSI  WORK WITH TCP/IP REMOTE SYSTEM INFORMATI
QTOCWRSO  PROCESS RSI OPTIONS FROM PANEL
QTOCWRTE  WORK WITH TCP/IP ROUTES
QTOCWRTO  PROCESS ROUTE OPTIONS FROM PANEL
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QTOCWTE WRKXXXTBLE CPP
QTOC4V3 ADJUST PRODUCT LIB LIST DURING CMD PROC
QTOICLCV CVTTCPCL COMMAND PROCESSING PROGRAM
QTOICONV CONVERSION AID FOR IFC, RTE, RSI, PORT
QTOIINS1 TCP/IP QUSRSYS INSTALL EXIT 1 PROGRAM
QTOISTRG CVTTCPCL STRING PROCESSING
QTOITBLK CVTTCPCL TABLE PROCESSING
QTONCLOS ENDTCPCNN CPP
QTONQSRT QUICK SORT UIM LIST PART OF NETSTAT
QTONSNAM NETSTAT PORT & IP ADDR NAMES RESOLUTION
QTONSTAT NETSTAT CPP <WRKTCPSTS CL CMD>
QTONUIXD NETSTAT UIM EXIT PGM <DETAILS/PRT>
QTONUIXL NETSTAT UIM EXIT PGM 1 <LISTS>
QTONVLIC NETSTAT VLIC/STREAMS I/F MODULE
QTOSACC ADD/CHANGE SNMP COMMUNITY CPP
QTOSACCV ADD/CHG SNMP COMMUNITY VALIDITY CHECKING
QTOSACTJ DETERMINE IF JOB IS ACTIVE
QTOSBCL BUILD COMMUNITY LIST
QTOSCAT CHANGE SNMP ATTRIBUTES CPP
QTOSCATP CHANGE SNMP ATTRIBUTES PROMPT OVERRIDE
QTOSCATV CHANGE SNMP ATTRIBUTES VALIDITY CHECKING
QTOSCCMP CHANGE SNMP COMMUNITY PROMPT OVERRIDE
QTOSCFG CFGTCPSNMP COMMAND PROCESSING PROGRAM
QTOSCFIE IEXIT PROGRAM FOR SNMP CONFIGURATION
QTOSCTLJ START/END SNMP AGENT JOB
QTOSGCDB GET CONTACT DATABASE INFORMATION
QTOSINZF INITIALIZE SNMP CONFIGURATION FILE
QTOSJRNL PUT ENTRY IN SNMP JOURNAL
QTOSOPEN OPEN SNMP CONFIGURATION FILE
QTOSPCM PROCESS SNMP COMMUNITY LIST ENTRY
QTOSPRCF PRINT SNMP CONFIGURATION INFORMATION
QTOSPRCM PRINT SNMP COMMUNITY INFORMATION
QTOSRCM REMOVE SNMP COMMUNITY CPP
QTOSSYSN CHANGE/RETRIEVE SYSTEM NAME
QTQADDII ADD SQCCSID1 INDEX ENTRIES AND MAPPINGS
QTQCVRT API TO CONVERT GRAPHIC DATA
QTQGCCN API TO GET CCSID FOR NORMALIZATION
QTQGESP API TO GET ENCODING SCHEME
QTQGRDC API TO GET RELATED DEFAULT CCSID
QTQMAPS SET UP THE CDRA TABLES
QTQMAPS2 SET UP THE CDRA TABLES #2
QTQMKMAP AUTOCREATE CCSID MAPPINGS
QTQMKMP1 AUTO CREATE CCSID MAPPINGS
QTQMKMP2 AUTO CREATE CCSID MAPPINGS
QTQMKMP3 AUTO CREATE CCSID MAPPINGS
QTQRECOV REBUILD & RELINK THE CDRA INDEXES
QTQSCSP API TO GET SHORT FORM CCSID
QTQSETUP SET UP THE TRANSLATE TABLES
QTSBLFMT TARGET/SOURCE BUILD FORMAT DEFINITION
QTSCLEAN CLEAN-UP ROUTINE FOR WRKDDMF CMD
QTSCLOSE DDM FILE SPECIFIC CLOSE
QTSCOPY DDM SOURCE COPY FILE
QTSDIXIT DDM SRC DELETE FILE INVOCATION EXIT
QTSDSDDM DISPLAYS DETAILS OF A DDM FILE - DSPDDMF
QTSEXTCT DDM FILE SOURCE DDM FILE EXTRACT
QTSFEOD DDM FILE SOURCE FORCE END-OF-DATA
QTSGET DDM FILE SOURCE GET SINGLE
QTSGETM DDM FILE SOURCE GET MULTIPLE
QTSGETSQ DDM FILE SOURCE GET SEQUENTIAL
QTSIEXIT DDM FILE SOURCE I/O INVOCATION EXIT
QTSLIXIT DDM FILE SOURCE LOCK INVOCATION EXIT
QTSLOCK DDM FILE SOURCE LOCK DDM FILE
QTSMDDMF DDM FILE SOURCE MANAGE DDM FILE
QTSMGAFT DDM FILE SOURCE MNG ACTIVE FILE TABLE
QTSOPEN DDM FILE SOURCE OPEN
QTSPUT DDM FILE SOURCE PUT SINGLE
QTSPUTDR DDM SOURCE PUT DIRECT SUPPORT
QTSPUTM DDM FILE SOURCE PUT MULTIPLE
QTSQEXIT SOURCE SIDE QUERY DDM FILE EXIT
QTSQUERY DDM FILE SOURCE QUERY
QTSREGFS REGISTER THE DDM FILE SYSTEM WITH API
QTSSALFM DDM SOURCE ADDLFM
QTSSCHGF DDM SOURCE SIDE FILE CHANGE
QTSSCRTF DDM SOURCE SIDE FILE CREATE
QTSSDELF SRC DELETE FILE
QTSSNMSG SOURCE MESSAGE CONVERSION
QTSSRNMF SRC RENAME FILE
QTSSTRMF DDM SOURCE SIDE LOAD/UNLOAD STREAM FILE
QTSS8MSG TARGET/SOURCE SOURCE MESSAGES
QTSTCHGD DDM TRG CHANGE/QUERY CURRENT DIRECTORY
QTSTCHGF DDM TARGET CHANGE FILE ATTRIBUTES
QTSTCLOS TS TARGET CLOSE
QTSTCLRF TS TARGET CLEAR FILE
QTSTCPYF TS TARGET CPYFIL
QTSTCRTF TS TARGET CREATE FILE
QTSTCSDR CREATE STREAM FILE - TARGET/SOURCE
QTSTDCLF TS TARGET DECLARE FILE
QTSTDELF DDM TARGET DELETE FILE
QTSTFEXD TS TARGET EXTRACT FILE
QTSTFRCB TS TARGET FRCBFF - DB AND FMS
QTSTIO TS TARGET GENERAL IO
QTSTIOS TS TARGET STREAM IO
QTSTLCKF TS TARGET LOCK/UNLOCK FILE
QTSTLODF TS TARGET LOAD FILE
QTSTLODS LOAD/UNLOAD STREAM FILE, TARGET
QTSTOPEN TS TARGET OPEN
QTSTQRYS QUERY SPACE MODULE
QTSTRNMF TS TARGET RNMFIL
QTSTUIXT TARGET/SOURCE USER INVOCATION EXIT
QTSTUNLF TS TARGET UNLOAD FILE
QTSTWILD GENERIC NAME PROCESSING MODULE
QTST8GEN TS TARGET S/38 GENERAL
QTST8IO TS TARGET S/38 IO
QTST8MSG TS TARGET S/38 MESSAGE HANDLER
QTSUDR DDM FILE UPD/DLT/RLS
QTSUIXIT TARGET/SOURCE UNLOCK INVOCATION EXIT
QTSUNLCK TARGET/SOURCE UNLOCK DDM FILE
QTSWKCHG UPDATES WRKDDMF AFTER CHGDDMF OPTION
QTSWKDDM WORK WITH DDM FILES COMMAND - WRKDDMF
QTVCLOVT VT-API CLOSE VIRTUAL TERMINAL
QTVENDLN DC INTERFACE TO ENDTCPIFC
QTVOPNVT QTVOPNVT HEADER IN ILE/COBOL
QTVOPNVT QTVOPNVT API HEADER FOR CBL
QTVOPNVT VT-API CLOSE VIRTUAL TERMINAL
QTVOPNVT QTVOPNVT API HEADER IN RPG
QTVOPNVT QTVOPNVT HEADER IN ILE/RPG
QTVRDVT VT-API CLOSE VIRTUAL TERMINAL
QTVSCMD VTM/FM COMMAND HANDLER (SERVER)
QTVSEVHD VTM/FM EVENT HANDLER (SERVER)
QTVSEXIT VTM/FM EXIT ROUTINE (SERVER)
QTVSGETL VTM/FM SERVER TCP/IP GET DEVICE LIST
QTVSINIT VTM/FM INITIALIZATION ROUTINE (SERVER)
QTVSNDRQ VT-API CLOSE VIRTUAL TERMINAL
QTVSREAD VTM/FM READ DATA ROUTINE (SERVER)
QTVSSYSR VTM/FM SERVER SYSTEM REQUEST HANDLER
QTVSTERM VTM/FM TERMINATE ROUTINE (SERVER)
QTVSWRIT VTM/FM WRITE DATA ROUTINE (SERVER)
QTVTBNAM VTM/FM FIND MAPPING TABLE
QTVTRACE VTM/FM TRACE MODULE
QTVUEH VTM/FM USER EVENT HANDLER
QTVUEHRT VTM/FM USER EVENT MONITOR HANDLER
QTVUGETL VTM/FM USER GET DEVICE LIST
QTVUINIT VTM/FM USER INITILAIZATION
QTVUINVE VTM/FM USER INVOCATION EXIT PROGRAM
QTVUREAD VTM/FM USER READ ROUTINE
QTVUTERM VTM/FM USER TERMINATION ROUTINE
QTVUUI VTM/FM VT100 USER INTERFACE
QTVUWRIT VTM/FM USER WRITE ROUTINE
QTVWRTVT VT-API CLOSE VIRTUAL TERMINAL
QTWAIDSP QTWAIDSP HEADER IN ILE/COBOL
QTWAIDSP QTWAIDSP API HEADER FOR CBL
QTWAIDSP SPELLING AID API
QTWAIDSP QTWAIDSP API HEADER IN RPG
QTWAIDSP QTWAIDSP HEADER IN ILE/RPG
QTWCHKSP QTWCHKSP HEADER IN ILE/COBOL
QTWCHKSP QTWCHKSP API HEADER FOR CBL
QTWCHKSP SPELL CHECK API
QTWCHKSP QTWCHKSP API HEADER IN RPG
QTWCHKSP QTWCHKSP HEADER IN ILE/RPG
QTWLGTBL LANGUAGE TABLE

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QTWRSLV   PLMI INTERFACE TO #DSTWAIN
QTWRSLV2  PLMI API INTERFACE TO #DSTWAIN
QTWSNDMS  PLMI API INTERFACE TO SNDPMSG
QTWSPCHK  C INTERFACE TO TWAIN FOR SPELL CHECK API
QTWSRCH   PLMI INTERFACE TO #DSTWAIN
QTWTRANS  PLMI API INTERFACE TO OTXTRANS
QT1ACFG   TDLC AUTOMATIC CONFIGURATION MODULE
QT1AVAIL  TDLC DATA AVAILABLE EVENT HANDLER
QT1ERPLD  TDLC IWS LUD ERP MODULE
QT1LUDCT  TDLC IWS LUD CONTACT MODULE
QT1LUDIN  TDLC INITIALIZE IWS LUD-ASP
QT1LUDRS  TDLC IWS LUD RESET MODULE
QT1VRYC   TDLC VARY LU 62 DEVICE COMPLETE HANDLER
QT3IOCMP  T3 REQIO COMPLETE EVENT HANDLER
QT3LUDIN  INITIALIZE T3 PORTION OF LUD-ASP
QT3LUDRS  RESET T3 PORTION OF LUD-ASP
QT3REQIO  T3-SNA MODULE FOR WS & WP
QT3UNSOL  UNSOLICITED DATA AVAILABLE EVENT HANDLER
QUCASDSP  COMPILE ASCII DISPLAY TAGS
QUCASPRT  COMPILE ASCII PRINTER TAGS
QUCCOMP   W/S CUSTOMIZATION RETRIEVE PDT
QUCCRTCO  WORKSTATION CUSTOMIZATION CRT CUST OBJ
QUCCVDAE  WSCST ASCII DISP ASCII TO EBCDIC CONVERS
QUCCVDAF  WSCST ASCII DISP ASCII TO KEYB F CONVERS
QUCCVDEA  WSCST ASCII DISP EBCDIC TO ASCII CONVERS
QUCCVDUS  WSCST ASCII DISP UPDATE SCRN TBL CONVERS
QUCCVPDM  WSCST PRINTER DEFAULT A->E TBL CONVERS
QUCCVPDT  WSCST PRINTER DEFINITION TBL CONVERSION
QUCCVPFT  WSCST PRINTER FUNCTION TABLE CONVERSION
QUCCVPMM  WSCST PRINTER MULTILANG A->E TBL CONVERS
QUCCVTKT  WSCST TWINX TRANSLATION TABLE CONVERSION
QUCCVXFM  WSCST EMULATOR ELIMINATOR TBL CONVERSION
QUCGETTB  WSCST GET CUSTOMIZED TABLE FOR EM ELIMIN
QUCRTDAE  W/S CUSTOMIZATION RETRIEVE DAET TABLE
QUCRTDAF  W/S CUSTOMIZATION RETRIEVE DAFT TABLE
QUCRTDEA  W/S CUSTOMIZATION RETRIEVE DEAT TABLE
QUCRTDUS  W/S CUSTOMIZATION RETRIEVE DUST TABLE
QUCRTNTB  WSCST RETURN CUST TABLE FOR EMUL ELIM
QUCRTPDM  WSCST PRINTER DEFAULT A->E TBL RETRIEVE
QUCRTPDT  W/S CUSTOMIZATION RETRIEVE PDT
QUCRTPFT  WSCST PRINTER FUNCTION TABLE RETRIEVE RO
QUCRTPMM  WSCST PRINTER MULTILANG A->E TBL RETRIEV
QUCRTTKT  W/S CUSTOMIZATION RETRIEVE TKTT TABLE
QUCRTVTB  WORKSTATION CUSTOMIZATION RETRIEVE TABLE
QUCRTVVC  WSCST VALIDITY CHECKER FOR RTVWSCST CMD
QUCRTXFM  WSCST RETRIEVE TRANSFORM TABLE
QUCTXDSP  COMPILE TWINAX DISPLAY TAGS
QUCTXPRT  COMPILE TWINAX PRINTER TAGS
QUCVRYOF  WORKSTATION CUSTOMIZATION VARY OFF PROC
QUCVRYON  WORKSTATION CUSTOMIZATION VARY ON PROC
QUCXFPRT  WSCST COMPILE EMULATOR ELIMINATOR TAGS
QUHADDIX  CPP FOR ADDSCHIDXE
QUHCHGIX  CPP FOR CHGSCHIDX COMMAND
QUHCRTIX  CPP FOR CRTSCHIDX COMMAND
QUHDSPH   DISPLAY HELP SERVICE
QUHEDTIX  EDIT SEARCH INDEX LIST FUNCTION
QUHFMT    UH/UIM ISIL FORMATTER
QUHHELP   HELP FACILITY DRIVER CPP
QUHHYPER  DISPLAY LIST OF HYPERTEXT LINKS TAKEN
QUHINFO   INDEX SEARCH FUNCTION OF HELP
QUHIXPOP  PROMPTER OVERRIDE FOR CHGSCHIX COMMAND
QUHPRINT  HELP FACILITY PRINT CPP
QUHPRTH   PRINT HELP SERVICE
QUHRMVIX  CPP FOR RMVSCHIDXE
QUHWIXXT  EXIT PROGRAM FOR WRKSCHIDXE
QUHWRKIX  CPP FOR WRKSCHIDXE
QUIACT    UIM ACTION DETERMINATION MODULE
QUIADDLE  ADD LIST ENTRY SERVICE
QUIADDLM  ADD LIST MULTIPLE ENTRIES SERVICE
QUIADDPA  ADD PRINT APPLICATION SERVICE
QUIADDPW  ADD POP-UP WINDOW SERVICE
QUIALIST  UIM ACTION LIST PROCESSOR
QUICBINT  UIM CONTROL BLOCK INITIALIZATION
QUICCHGM  CHANGE MENU CPP
QUICCRTM  CREATE MENU CPP
QUICDLTM  DELETE MENU CPP
QUICDSPM  DISPLAY MENU ATTRIBUTES CPP
QUICLINE  COMMAND LINE POP-UP PROGRAM
QUICLOA   CLOSE APPLICATION SERVICE
QUICLOSE  UIM APPLICATION CLOSE MODULE
QUICMD    UIM USER PROGRAM AND COMMAND INTERFACE
QUICMENU  GO COMMAND CPP
QUIDLTL   DELETE LIST SERVICE
QUIDSPP   DISPLAY PANEL SERVICE
QUIEXFMT  UIM EXECUTION TIME FORMATTER
QUIFDATA  UIM PRE-PROCESSOR FORMATTER: DATA AREA
QUIFINFO  UIM PRE-PROCESSOR FORMATTER: INFO AREA
QUIFLIST  UIM PRE-PROCESSOR FORMATTER: LIST AREA
QUIFMENU  UIM PRE-PROCESSOR FORMATTER: MENU AREA
QUIFPRT   UIM PRE-PROCESSOR FORMATTER: PRINT SHELL
QUIFSHLL  UIM PRE-PROCESSOR FORMATTER: PANEL SHELL
QUIFTEXT  UIM PRE-PROCESSOR FORMATTER: TEXT AREA
QUIGETLE  GET LIST ENTRY SERVICE
QUIGETLM  GET LIST MULTIPL ENTRIES SERVICE
QUIGETV   GET DIALOG VARIABLE SERVICE
QUIICHK   UIM INPUT FIELD AND CONDITION PROCESSING
QUIIEXIT  INVOCATION EXIT PROGRAM
QUIINMGR  UIM INTERACTION MANAGER
QUILIST   UIM LIST MANAGER
QUILNGNM  COMMAND LINE POP-UP OVER ANYTHING
QUILXLST  UIM EXTEND LIST
QUIMGFLW  UIM PANEL FLOW MANAGER - DSPPNL
QUIMIEXT  MENU DRIVER INVOCATION EXIT PROGRAM
QUIMNDRV  MENU DRIVER
QUIMNPOP  PROMPTER OVERRIDE FOR CHGMNU COMMAND
QUIMNSAV  SAVE MENU FOR N TO N-1
QUIMSTK   MANIPULATE MENU STACK
QUIOCNV   UIM OUTBOUND CONVERSION
QUIOPEN   UIM APPLICATION OPEN MODULE
QUIOPNDA  OPEN DISPLAY APPLICATION SERVICE
QUIOPNPA  OPEN PRINT APPLICATION SERVICE
QUIPOP    UIM POP-UP MANAGER : ADDPOP & RMVPOP
QUIPPAUG  PDL COMPILER - AUGMENT TREE
QUIPPCPP  PANEL DEFINITION LANGUAGE COMPILER CPP
QUIPPCTS  MODULE TO CALCULATE HASH TABLE SIZE__
QUIPPFMT  UIM PRE-PRECESSOR TIME FORMAT MANAGER
QUIPPGEN  PDL COMPILER - GENERATE OBJECT
QUIPPIEX  PDL COMPILER - INVOCATION EXIT
QUIPPLST  PDL COMPILER - GENERATE LISTING
QUIPPPH1  PDL COMPILER - PHASE 1
QUIPPPRT  PDL COMPILER - GENERATE PROTOTYPE NODES
QUIPPRD   PDL COMPILER - READ SOURCE
QUIPPRSL  PDL COMPILER - RESOLVE REFERENCES
QUIPPSTO  PDL COMPILER - STORAGE ALLOCATION
QUIPRINT  UIM EXECUTION TIME PRINT FORMATTER
QUIPRTP   PRINT PANEL SERVICE
QUIPUTV   PUT DIALOG VARIABLE SERVICE
QUIRCLAP  RECLAIM UIM APPLICATION RESOURCES
QUIRMVLE  REMOVE LIST ENTRY SERVICE
QUIRMVPA  REMOVE PRINT APPLICATION SERVICE
QUIRMVPW  REMOVE POP-UP WINDOW SERVICE
QUIRTVLA  RETRIEVE LIST ATTRIBUTES SERVICE
QUISAVE   UIM SAVE OBJECT HANDLER
QUISCRL   UIM SCROLL MODULE
QUISETLA  SET LIST ATTRIBUTES SERVICE
QUISETSC  SET SCREEN IMAGE SERVICE
QUISTSCN  UIM SAVE SCREEN IMAGE
QUIUPDLE  UPDATE LIST ENTRY SERVICE
QUIVPMGR  VARIABLE POOL MANAGER
QUOCMD    PDM CA INTERFACE
QUPCMNVR  VFYCMN MAIN DRIVER
QUPCNFG   UP CONFIG MODULE
QUPDRVR   UPPR MAIN DRIVER
QUPGENVR  UPPR MODULE FOR COMM VERIFICATION
QUPIEXIT  UPPR I-EXIT
QUPMENU   ANZPRB EXIT PRG TO SHOW MENU/CMD/PRC SCN
QUPSSG    UP SYMPTOM STRING GENERATOR
QUPTAPVR  UPPR MODULE FOR TAPE VERIFICATION
QUPUPPR   UP COMMAND PROCESSOR
QUPVLIC   ANZPRB EXIT PRG TO ADD VLIC KEYWORD
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QURBAR4O R4O LANGUAGES EXIT PROGRAM FOR QGP
QUREZR4O INSTALL EXIT ROUTINE FOR OPER ASSISTANT
QURLOCK LOCK ANCHOR FILES
QUROFC OFFICE UMBRELLA FOR INZSYS PROCESSING
QUROHR4O LIST DIA CPP
QURTRNFL PTF TRANSLATION FOR CALENDARS
QURUNLCK UNLOCK ANCHOR FILES
QURUYR4O EXIT PROGRAM FOR UTILITIES
QUS QUS HEADER IN ILE/COBOL
QUS QUS API HEADER FOR CBL
QUS QUS API HEADER IN RPG
QUS QUS HEADER IN ILE/RPG
QUSADDEP QUSADDEP API HEADER IN CBL
QUSADDUI ADD USER INDEX ENTRIES API
QUSADDUI QUSADDUI HEADER IN ILE/COBOL
QUSADDUI QUSADDUI API HEADER FOR CBL
QUSADDUI QUSADDUI API HEADER IN RPG
QUSADDUI QUSADDUI HEADER IN ILE/RPG
QUSAXPGM US ADD EXIT PROGRAM CPP
QUSCHGPA CHANGE POOL ATTRIBUTES
QUSCHGUS CHANGE USER SPACE
QUSCMDLN COMMAND LINE POP-UP OVER ANYTHING
QUSCRTUI CREATE USER INDEX
QUSCRTUQ CREATE USER QUEUE
QUSCRTUS CREATE USER SPACE
QUSCUSAT CHANGE USER SPACE ATTRIBUTES
QUSCUSAT QUSCUSAT HEADER IN ILE/COBOL
QUSCUSAT QUSCUSAT API HEADER FOR CBL
QUSCUSAT QUSCUSAT API HEADER IN RPG
QUSCUSAT QUSCUSAT HEADER IN ILE/RPG
QUSDLTUI DELETE USER INDEX API
QUSDLTUQ DELETE USER QUEUE API
QUSDLTUS DELETE USER SPACE FOR SPT
QUSEC ERROR CODE
QUSEC ERROR CODE
QUSEC QUSEC HEADER IN ILE/COBOL
QUSEC QUSEC HEADER IN ILE/RPG
QUSGEN GENERIC HEADER USER SPACE
QUSGEN GENERIC HEADER USER SPACE
QUSGEN QUSGEN HEADER IN ILE/COBOL
QUSGEN QUSGEN HEADER IN ILE/RPG
QUSIEXIT US MODULES INVOCATION EXIT PROGRAM
QUSLFLD QUSLFLD HEADER IN ILE/COBOL
QUSLFLD QUSLFLD API HEADER FOR CBL
QUSLFLD SPT: LIST FILE FIELD FORMATS
QUSLFLD QUSLFLD API HEADER IN RPG
QUSLFLD QUSLFLD HEADER IN ILE/RPG
QUSLJOB LIST JOB API
QUSLJOB QUSLJOB HEADER IN ILE/COBOL
QUSLJOB QUSLJOB API HEADER FOR CBL
QUSLJOB QUSLJOB API HEADER IN RPG
QUSLJOB QUSLJOB HEADER IN ILE/RPG
QUSLMBR QUSLMBR HEADER IN ILE/COBOL
QUSLMBR QUSLMBR API HEADER FOR CBL
QUSLMBR SPT: LIST FILE FIELD FORMATS
QUSLMBR QUSLMBR API HEADER IN RPG
QUSLMBR QUSLMBR HEADER IN ILE/RPG
QUSLOBJ LIST OBJECT API
QUSLOBJ QUSLOBJ HEADER IN ILE/COBOL
QUSLOBJ QUSLOBJ API HEADER FOR CBL
QUSLOBJ QUSLOBJ API HEADER IN RPG
QUSLOBJ QUSLOBJ HEADER IN ILE/RPG
QUSLRCD QUSLRCD HEADER IN ILE/COBOL
QUSLRCD QUSLRCD API HEADER FOR CBL
QUSLRCD SPT: LIST FILE RECORD FORMATS
QUSLRCD QUSLRCD API HEADER IN RPG
QUSLRCD QUSLRCD HEADER IN ILE/RPG
QUSLSPL QUSLSPL HEADER IN ILE/COBOL
QUSLSPL QUSLSPL API HEADER FOR CBL
QUSLSPL SPT: LIST FILE RECORD FORMATS
QUSLSPL QUSLSPL API HEADER IN RPG
QUSLSPL QUSLSPL HEADER IN ILE/RPG
QUSPTRUS LOCATE POINTER TO *USRSPC OBJECT
QUSREG QUSREG HEADER IN ILE/COBOL
QUSREG QUSREG API HEADER FOR CBL
QUSREG QUSREG API HEADER IN RPG
QUSREG QUSREG HEADER IN ILE/RPG
QUSRGPT QUSRGPT API HEADER IN CBL
QUSRJOBI QUSRJOBI HEADER IN ILE/COBOL
QUSRJOBI QUSRJOBI API HEADER FOR CBL
QUSRJOBI RETRIEVE JOB INFORMATION
QUSRJOBI QUSRJOBI API HEADER IN RPG
QUSRJOBI QUSRJOBI HEADER IN ILE/RPG
QUSRMBRD COBOL INCLUDE FOR API QUSRMBRD
QUSRMBRD QUSRMBRD HEADER IN ILE/COBOL
QUSRMBRD SPT: RETRIEVE FILE MEMBER DESCRIPTION
QUSRMBRD QUSRMBRD HEADER IN ILE/RPG
QUSRMBRD RPG INCLUDE FOR API QUSRMBRD
QUSRMVUI REMOVE USER INDEX ENTRIES
QUSROBJD QUSROBJD HEADER IN ILE/COBOL
QUSROBJD QUSROBJD API HEADER FOR CBL
QUSROBJD RETRIEVE OBJECT DESCRIPTION
QUSROBJD QUSROBJD API HEADER IN RPG
QUSROBJD QUSROBJD HEADER IN ILE/RPG
QUSRSPLA QUSRSPLA HEADER IN ILE/COBOL
QUSRSPLA QUSRSPLA API HEADER FOR CBL
QUSRSPLA RETURN SPOOL FILE ATTRIBUTES API
QUSRSPLA QUSRSPLA API HEADER IN RPG
QUSRSPLA QUSRSPLA HEADER IN ILE/RPG
QUSRSTUI USER INDEX RESTORE OBJECT HANDLER
QUSRSTUQ USER QUEUE RESTORE OBJECT HANDLER
QUSRSTUS USER SPACE RESTORE OBJECT HANDLER
QUSRTVEI QUSRTVEI API HEADER IN CBL
QUSRTVUI RETRIEVE USER INDEX ENTRIES
QUSRTVUS RETRIEVE CONTENTS OF A USER SPACE
QUSRUIAT QUSRUIAT HEADER IN ILE/COBOL
QUSRUIAT QUSRUIAT API HEADER FOR CBL
QUSRUIAT RETRIEVE USER INDEX ATTRIBUTES API
QUSRUIAT QUSRUIAT API HEADER IN RPG
QUSRUIAT QUSRUIAT HEADER IN ILE/RPG
QUSRUSAT QUSRUSAT HEADER IN ILE/COBOL
QUSRUSAT QUSRUSAT API HEADER IN CBL
QUSRUSAT RETRIEVE USER SPACE ATTRIBUTES
QUSRUSAT QUSRUSAT API HEADER IN RPG
QUSRUSAT QUSRUSAT HEADER IN ILE/RPG
QUSRXPGM US REMOVE EXIT PROGRAM CPP
QUSSAVUQ USER QUEUE SAVE OBJECT HANDLER
QUSWRKRI US WORK WITH REGISTRATION INFO CPP
QUTBIIX $BICR EXIT ROUTINE
QUTBMNU CREATE A MENU FROM A MESSAGE FILE
QUTCOADP QUTCOADP - PERF FUNCTION W/ ADOPTED AUTH
QUTCOEAV $COPY EXTRACT AND VALIDATE FILE INFO
QUTCOFF $COPY (FROM FIXED DISK TO FIXED DISK)
QUTCOIX QUTCOIX - $COPY UTIL INVOCATION EXIT
QUTCORS QUTCORS - COPY FROM DSKT/TAPE TO DISK
QUTCOSV QUTCOSV - COPY FROM DISK TO DSKT/TAPE
QUTDEF1 QUTDEF1--DELETE FROM DISK
QUTDEIX $DELET INVOCATION EXIT ROUTINE
QUTDEI1 QUTDEI1 - DELETE FROM DISKETTE
QUTDUIX $DUPIX - $DUPRD INVOCATION EXIT
QUTHCLN $HIST PROCEDURE INVOCATION EXIT
QUTHLPO HELP OBJECT CREATION
QUTHLP1 CREATE HELP OBJECT PART2
QUTHLST HELP OCL/PCE CONTROL INFORMATION
QUTINIX $INIT EXIT ROUTINE
QUTLAF1 $LABF1 - DISPLAY OF DISK VTOC
QUTLAIX $LABEL INVOCATION EXIT ROUTINE
QUTMAIX $MAINT IEXIT PROGRAM
QUTMASA $MAINT SUBROUTINE WITH ADOPT QSYS
QUTMASR $MAINT PRIMARY SUBROUTINE
QUTMGBLD CREATE A MESSAGE FILE FROM S/36 MSG SRC
QUTMSGID GET MSG TEXT FOR WS/DDS MSGID KEYWORD
QUTREIX $RENAM INVOCATION EXIT ROUTINE
QUTREN1 $RENAM SUBMODULE FOR EXISTENCE CHECKS
QUTRGZF QUTRGZF MAINLINE MODULE
QUTSFCHK SFGR SYNTAX CHECKER
QUTSFC01 CNVSFGR - MACRO PROCESSING PROGRAM
QUTSFGR CREATE A DISPLAY FILE FROM S/36 SFGR SRC
QUTSFIGC HANDLE IGC IN DDS OUTPUT FROM $SFGR
QUTSFPC UPDATE POSITION CURSOR IN SFGR->DDS

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QUTTCIX   $TCOPY (TAPECOPY) INVOCATION EXIT PGM
QUTUACHK  USER ACCESS TO SPOOL - VALIDATE VALUES
QUTUADP   USER ACCESS TO SPOOL - UIM DSP/PRT
QUTUASIX  USER ACCESS TO SPOOL - INVOCATION EXIT
QVTRMSTG  QVTRMSTG HEADER IN ILE/COBOL
QVTRMSTG  QVTRMSTG API HEADER FOR CBL
QVTRMSTG  VADOR API PROGRAM
QVTRMSTG  QVTRMSTG API HEADER IN RPG
QVTRMSTG  QVTRMSTG HEADER IN ILE/RPG
QVTSERVR  VADOR API SERVER PROGRAM
QWCADSVR  VARY OFF CONSOLE BEFORE HRM
QWCAHNAE  SYSTEM ARBITER INPUT QUEUE EVENT HANDL
QWCAHNKE  LOCK EVENT HANDLER
QWCAHNTM  HANDLE WCBT MSG PROCESSOR
QWCAINAR  SYSTEM ARBITER INITIATION
QWCAMCKE  SYSTEM MACHINE EVENT HANDLER
QWCAMNAR  SYSTEM ARBITER MAINLINE PROGRAM
QWCAROTE  24HR ROLLOVER EVENT HANDLER
QWCASCUE  SUBSYSTEM MONITOR TERMINATION EVH
QWCASDSM  TERMINATE SYSTEM MESSAGE PROCESSOR
QWCASDUM  TERMINATE SUBSYSTEM MESSAGE PROCESSOR
QWCASUUM  START SUBSYSTEM MESSAGE PROCESSOR
QWCATARE  MACH RESOURCE THRESHOLD AND TIMER EH
QWCAT1TE  SUBSYSTEM TERMINATION TIMER EVH
QWCAT2TE  SYSTEM TERMINATION TIMER EVH
QWCAUPRM  UPDATE ROLLOVER EVENT MSG PROCESSOR
QWCCAAYC  ADD JOB SCHEDULE ENTRY CPP
QWCCALOC  ALLOCATE OBJECT CPP
QWCCCHCC  CHANGE CLASS CPP
QWCCCHLC  CHANGE SYSTEM VALUE CPP
QWCCCHNC  CHANGE NETWORK ATTRIBUTES
QWCCCHPC  CHANGE SHARED POOL CPP
QWCCCHVC  CHANGE DATA AREA CPP
QWCCCHYC  CHANGE JOB SCHEDULE ENTRY CPP
QWCCCJOB  API TO CHANGE CURRENT JOB
QWCCCRCC  CREATE CLASS CPP
QWCCCRVC  CREATE DATA AREA CPP
QWCCDAOC  DEALLOCATE OBJECT CPP
QWCCDSAC  DISPLAY ACTIVE JOBS CPP
QWCCDSCC  DISPLAY CLASS CPP
QWCCDSDC  WORK WITH DISK STATUS
QWCCDSIC  DISPLAY JOB CALL STACK CPP
QWCCDSJC  DISPLAY JOB CPP
QWCCDSKC  OBJECT LOCK DISPLAY CPP
QWCCDSLC  DISPLAY SYSTEM VALUE CPP
QWCCDSNC  DISPLAY NETWORK ATTRIBUTES
QWCCDSPC  WORK WITH SHARED POOLS CPP
QWCCDSSC  DISPLAY SYSTEM CPP
QWCCDSTC  DISPLAY SYSTEM STATUS CPP
QWCCDSUC  DISPLAY SUBSYSTEM & SUBMITTED JOBS CPP
QWCCDSVC  DISPLAY DATA AREA CPP
QWCCHGTN  API TO CHANGE STORAGE POOL TUNING
QWCCHGTN  QWCCHGTN HEADER IN ILE/COBOL
QWCCHGTN  QWCCHGTN API HEADER FOR CBL
QWCCHGTN  QWCCHGTN API HEADER IN RPG
QWCCHGTN  QWCCHGTN HEADER IN ILE/RPG
QWCCHRYC  HOLD/RELEASE JOB SCHEDULE ENTRIES CPP
QWCCLFEC  SIGNOFF CPP
QWCCRCRC  RECLAIM RESOURCES CPP
QWCCRMYC  REMOVE JOB SCHEDULE ENTRIES CPP
QWCCRTEC  DUMP IPL PERFORMANCE DATA
QWCCRTNC  RETRIEVE NETWORK ATTRIBUTES CPP
QWCCSDSC  TRMCPF/PWRDWNSYS CPP
QWCCSDUC  TERMINATE SUBSYSTEM CPP
QWCCSUUC  START SUBSYSTEM CPP
QWCCVTDT  CONVERT DATE FORMAT API
QWCCWRLC  WORK WITH SYSTEM VALUE CPP
QWCCWRLR  WORK WITH SYSTEM VALUE SUPPORT ROUTINE
QWCCWRYC  WORK WITH JOB SCHEDULE ENTRIES CPP
QWCDLYJB  DELAY JOB (DLYJOB) CPP
QWCDMGNT  LOCAL DATA AREA DMG NOTIFICATION PGM
QWCIBAEQ  BUILD WCBT AVAILABLE ENTRY QUEUE
QWCICCWO  WCBT CONVERSION ROUTINE
QWCICKRR  IPL DASD CAPACITY CHECK
QWCICLSR  WCBT CLEANUP ROUTINE
QWCICLTR  WCBT SYSTEM JOB ROUTINE FOR CLNUP
QWCIDIOR  START XPF DISPLAY I/O ROUTINE
QWCIDSPR  INITIAL DEVICE HANDLING DURING THE IPL
QWCIDSWO  DESTROY WCBT OBJECTS ROUTINE
QWCIINSR  INITIAL SYSTEM ROUTINE
QWCILE1R  QSYS LPM EXIT PROGRAM - BEFORE
QWCILE2R  QSYS LPM EXIT PROGRAM - AFTER
QWCILE3R  QSYS LPM EXIT PROGRAM - BEFORE
QWCILE4R  QSYS LPM EXIT PROGRAM - AFTER
QWCILSVR  INSTALL LANGUAGE SENSITIVE SYSTEM VALUES
QWCINIPP  SYSTEM JOB INITIATION PHASE PROGRAM
QWCIPDEH  INITIAL PROCESS DEFAULT EXCP HNDLR
QWCISCFR  START XPF ROUTINE
QWCISTSJ  START SYSTEM JOB ROUTINE
QWCITRSE  SYSTEM TERMINATION EVENT HANDLER
QWCITUNR  IPL AUTO-TUNER
QWCJERYE  JOB SCHEDULER "END RESTRICTED STATE"
QWCJFXYE  JOB SCHEDULER "HANDLE FIXUP TIMER"
QWCJHNRE  JOB SCHEDULER "LOCK REQUEST GRANTED"
QWCJHTJE  SCHEDULED JOBS OCCURRENCE TIMER
QWCJHTYE  JOB SCHEDULER "HANDLE OCCURRENCE TIMER"
QWCJMNYR  JOB SCHEDULER MAINLINE PROGRAM
QWCJSRYR  JOB SCHEDULER IPL, DAMAGE, AND RESTORE
QWCJSTJE  SCHEDULED JOBS RESET OCCURRENCE TIMER
QWCJSTYE  JOB SCHEDULER "RESET OCCURRENCE TIMER"
QWCLASBS  API TO LIST JOBS IN A SUBSYSTEM
QWCLASBS  QWCLASBS HEADER IN ILE/COBOL
QWCLASBS  QWCLASBS API HEADER FOR CBL
QWCLASBS  QWCLASBS API HEADER IN RPG
QWCLASBS  QWCLASBS HEADER IN ILE/RPG
QWCLINSR  LUS PROCESS INITIATION PHASE PROGRAM
QWCLMNSR  LUS PROCESS PROBLEM PHASE PROGRAM
QWCLOBJL  QWCLOBJL HEADER IN ILE/COBOL
QWCLOBJL  QWCLOBJL API HEADER FOR CBL
QWCLOBJL  WC API TO LIST OBJECT LOCKS
QWCLOBJL  QWCLOBJL  API HEADER IN RPG
QWCLOBJL  QWCLOBJL HEADER IN ILE/RPG
QWCLSCDE  API TO LIST JOB SCHEDULE ENTRIES
QWCLSCDE  QWCLSCDE HEADER IN ILE/COBOL
QWCLSCDE  QWCLSCDE API HEADER FOR CBL
QWCLSCDE  QWCLSCDE API HEADER IN RPG
QWCLSCDE  QWCLSCDE HEADER IN ILE/RPG
QWCOPYRT  COPYRIGHT MODULE
QWCPCRRR  DYNAMIC STORAGE POOL TUNER INIT
QWCPMNRR  MAINLINE FOR SYSTEM JOB QPFRADJ
QWCPRQRM  REQUEST RESOURCES MESSAGE PROCESSOR
QWCPRSRE  EVENT HANDLER FOR REQUEST RSC EVENT
QWCPUPRR  DYNAMIC STORAGE POOL TUNER
QWCRDTAA  API TO RETREIVE DATA AREA CONTENTS
QWCRDTAA  QWCRDTAA HEADER IN ILE/COBOL
QWCRDTAA  QWCRDTAA API HEADER FOR CBL
QWCRDTAA  QWCRDTAA API HEADER IN RPG
QWCRDTAA  QWCRDTAA HEADER IN ILE/RPG
QWCRNETA  API TO RETREIVE NETWORK ATTRIBUTES
QWCRNETA  QWCRNETA HEADER IN ILE/COBOL
QWCRNETA  QWCRNETA API HEADER FOR CBL
QWCRNETA  QWCRNETA API HEADER IN RPG
QWCRNETA  QWCRNETA HEADER IN ILE/RPG
QWCRSSTS  QWCRSSTS HEADER IN ILE/COBOL
QWCRSSTS  QWCRSSTS API HEADER FOR CBL
QWCRSSTS  RETRIEVE SYSTEM STATUS INFORMATION
QWCRSSTS  QWCRSSTS API HEADER IN RPG
QWCRSSTS  QWCRSSTS HEADER IN ILE/RPG
QWCRSVAL  API TO RETREIVE SYSTEM VALUES
QWCRSVAL  QWCRSVAL HEADER IN ILE/COBOL
QWCRSVAL  QWCRSVAL API HEADER FOR CBL
QWCRSVAL  QWCRSVAL API HEADER IN RPG
QWCRSVAL  QWCRSVAL HEADER IN ILE/RPG
QWCSADVR  ALCOBJ/DLCOBJ INPUT VALIDITY CHECKER
QWCSCDFR  CHANGE DATE FORMAT ROUTINE
QWCSCRLR  CREATE/CONVERT SYSTEM VALUE OBJECT
QWCSCVDR  CONVERT DATE SUPPORT ROUTINE
QWCSCVLR  CONVERT TO LARGER SYSTEM VALUE OBJECT
QWCSCVTR  CONVERT TIME SUPPORT ROUTINE
QWCSDSAR  DISPLAY ACTIVE JOBS EXCLUDE MODULE
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QWCSDSFR SPL FILES & INV STACK INTERFACE MODULE
QWCSDSIM DISPLAY CALL STACK MESSAGE PROCESSOR
QWCSDSKC JOB LOCK DISPLAY ROUTINE
QWCSDSKR ADDITIONAL LOCK DISPLAY ROUTINE
QWCSDSKS DISPLAY JOB LOCKS SETUP ROUTINE
QWCSDSMR DISPLAY JOB MESSAGES FROM UIM MODULE
QWCSHCFR QWCSHCFR
QWCSHUIC HANDLE COMMAND FROM DISPLAY MODULE (3)
QWCSNSYR CALCULATE NEXT SUBMISSION DATE
QWCSRSYR RESTORE HANDLER FOR JOB SCHEDULE OBJECT
QWCSRTJR RETRIEVE JOB INFORMATION
QWCSRTLR RETRIEVE SYSTEM VALUE
QWCSRTVR RETRIEVE DATA AREA ROUTINE
QWCSSLJR SELECT JOB SUPPORT ROUTINE
QWCSSVYR SAVE JOB SCHEDULER HANDLER
QWCSUPLR UPDATE SYSTEM VALUE OBJECT
QWCSVRDR VERIFY DATE ROUTINE
QWCSVRJR VERIFY COMMAND FROM DISPLAY MODULE
QWCSVRTR VERIFY TIME ROUTINE
QWCSWRYR WRKJOBSCDE SUPPORT ROUTINE
QWCSXTCR EXTRACT CLASS OBJECT INFO
QWCSXTJR EXTRACT JOB INFO
QWCSXTYR CHGJOBSCDE PROMPT OVERRIDE PROGRAM
QWDCADA ADD AUTOSTART JOB ENTRY CPP
QWDCADC ADD COMMUNICATIONS ENTRY CPP
QWDCADJ QWDCADJ
QWDCADP ADD PRESTARTED JOB ENTRY CPP
QWDCADQ ADD JOB QUEUE ENTRY CPP
QWDCADR ADD ROUTING ENTRY CPP
QWDCCHA CHANGE AUTOSTART JOB ENTRY CPP
QWDCCHC CHANGE COMMUNICATIONS ENTRY
QWDCCHD CHANGE SUBSYSTEM DESCRIPTION CPP
QWDCCHG QWDCCHG
QWDCCHJ QWDCCHJ
QWDCCHP CHANGE PRESTARTED JOB ENTRY
QWDCCHQ CHANGE JOB QUEUE ENTRY CPP
QWDCCHR CHANGE ROUTING ENTRY CPP
QWDCCRD CREATE SUBSYSTEM DESCRIPTION CPP
QWDCCRG QWDCCRG
QWDCDLJ DELETE WORK ENTRY CPP
QWDCDLR REMOVE ROUTING ENTRY CPP
QWDCDSD QWDCDSD
QWDCDSG QWDCDSG
QWDDMGNT SUBSYSTEM DESCRIPTION DAMAGE NOTIF PGM
QWDGEXT EXTRACT JOB DESCRIPTION OBJECT INFO
QWDGMSG JOB DESCRIPTION MESSAGE MODULE
QWDJDVF VERIFY DEVICE FILE
QWDJFNE FIND WORK ENTRY MODULE
QWDLSJBQ API TO LIST SBS JOB QUEUE ENTRIES
QWDLSJBQ QWDLSJBQ HEADER IN ILE/COBOL
QWDLSJBQ QWDLSJBQ API HEADER FOR CBL
QWDLSJBQ QWDLSJBQ API HEADER IN RPG
QWDLSJBQ QWDLSJBQ HEADER IN ILE/RPG
QWDMCNVT SBSD LEVEL CONVERSION MODULE
QWDMMSG QWDMMSG
QWDMPACK PACK SUBSYSTEM DESCRIPTION CPP
QWDMRCVR SUBSYSTEM DESCRIPTION RECOVERY MODULE
QWDMRSLV EXTERNAL OBJECT RESOLVE MODULE
QWDMXTND SUBSYSTEM DESCRIPTION EXTENSION MODULE
QWDRJOBD QWDRJOBD HEADER IN ILE/COBOL
QWDRJOBD QWDRJOBD API HEADER FOR CBL
QWDRJOBD RETRIEVE JOB DESCRIPTION API
QWDRJOBD QWDRJOBD API HEADER IN RPG
QWDRJOBD QWDRJOBD HEADER IN ILE/RPG
QWDRSBSD QWDRSBSD HEADER IN ILE/COBOL
QWDRSBSD QWDRSBSD API HEADER FOR CBL
QWDRSBSD RETRIEVE SUBSYSTEM INFORMATION
QWDRSBSD QWDRSBSD API HEADER IN RPG
QWDRSBSD QWDRSBSD HEADER IN ILE/RPG
QWDSYWRK CALL PROGRAMS FOR QSYSWRK SUBSYSTEM
QWHCLEAN WH CLEANUP MODULE
QWHDSDBR DSPDBR CPR
QWHDSFFD DSPFFD CPR
QWHDSPFD DSPFD CPR
QWHDSPPR DSPFD CPR
QWHFDCHK VALIDITY CHECKER FOR DSPFD
QWHFDOUT CPP FOR DSPFD OUTFILE
QWHOUTFL OUTFILE VALIDATION/CREATION
QWHRMBRD OUTFILE VALIDATION/CREATION
QWHRMCHK RETRIEVE MEMBER DESCRIPTION VAL CHECKER
QWPALLOC PRINTER OPEN TIME MODULE
QWPAPTFL FIELD LEVEL AFPDS PUT MODULE
QWPAPUT NON-FIELD LEVEL AFPDS PUT MODULE
QWPASPRT PLACE ASCII DATA ON SPOOL
QWPCLOSE REMOTE PRINTER CLOSE MODULE
QWPERROR WORKSTATION PRINTER ERROR HANDLER
QWPEXPRT EXTRACT PRINT MODULE FOR WP
QWPFEOD REMOTE PRINTER FEOD MODULE
QWPFTSWP QWPFTSWP
QWPGRAPH QWPGRAPH
QWPGRCLS QWPGRCLS
QWPGREOP QWPGREOP
QWPIFLDF QWPIFLDF
QWPIGRPH QWPIGRPH - IPDS GRAPHICS MODULE
QWPINASP INITIALIZE QWPALLOC ASSOCIATED SPACE
QWPIPTFL QWPIPTFL
QWPIPTRN TRANSFORM IPDS TO AFPDS
QWPIPUT QWPIPUT
QWPIPUTF QWPIPUTF
QWPLDPRT 1403 LINE DATA PASS THROUGH MODULE
QWPLDTRN TRANSFORM 1403 LINE DATA TO SCS
QWPLUDIN QWPLUDIN
QWPMODCA PRINTER MODCA PASS THROUGH MODULE
QWPMOTRN TRANSFORM MODCA TO SCS
QWPNWEVT REMOTE PRINTER NO-WAIT EVENT HANDLER
QWPOERRS PRINTER OPEN TIME ERRORS
QWPOPEN QWPOPEN
QWPORDER QWPORDER
QWPPERRS PRINTER PUT TIME ERRORS
QWPPFLDF QWPPUTF
QWPPSDS PSDS PASS THROUGH MODULE
QWPPSUBR IPDS ADVANCED PRINTER FUNCTION PRPQ
QWPPTFLD SCS FIELD LEVEL PUT MODULE
QWPPUT SCS PUT MODULE
QWPPUTF QWPPUTF
QWPREOPN QWPREOPN
QWPREQIO WORKSTATION PRINTER REQIO
QWPSCPRT HANDLE PRE-BUILT DATA STREAM
QWPSCTRN TRANSFORM SCS TO IPDS
QWPSETPT QWPSETPT
QWPUSEVH QWPUSEVH
QWPXPRMA QWPXPRMA
QWPXPUT XTRA PUT MODULE FOR WP
QWPZGEED RETRIEVE DEFAULTS FOR MANF TYPE
QWPZTAFP POINTER VERIFICATION PROGRAM
QWPZTAFP QWPZTAFP HEADER IN ILE/COBOL
QWPZTAFP QWPZTAFP API HEADER FOR CBL
QWPZTAFP QWPZTAFP API HEADER IN RPG
QWP4O19 QWP4O19
QWSCLOSE WS/CL CLOSE
QWSCRTRB WS/RB CREATE RB
QWSDSMSG WS/DM DISPLAY STATUS MESSAGE HANDLER
QWSERROR WS/ER T3 ERROR HANDLER
QWSEXTSA QWSEXTSA
QWSGET WS/GT GET
QWSGRID WORKSTATION FM GRID LINE SUPPORT
QWSHELP APPLICATION HELP
QWSHLGUI HELP LIST MAINTENANCE GRAPHICAL USER INT
QWSHLM AP HELP LIST MAINTANENCE MODULE
QWSLUDIN WS/LI LUD-ASSOC SPACE INIT ROUTINE
QWSLUDRS WS/LI RESET LUD ASP
QWSMEEH WS/NW NOWAIT EVENT HANDLER
QWSMISC WORKSTATION MISCELLANEOUS FUNCTIONS
QWSMSG WS/ML MESSAGE LIGHT HANDLER
QWSMSWAP WS MRT SWAP MODULE
QWSOPEN WS/OP OPEN
QWSPBDVR WS PREBUILD DRIVER
QWSPBFTD WORKTATION PREBUILD CODE
QWSPBICF WORKSTATION PREBUILD CODE
QWSPBOOF WORKSTATION PREBUILD CODE

QWSPBRCD WORKSTATION PREBUILD CODE
QWSPBSFE WORKSTATION PREBUILD CODE
QWSPRINT WS PRINT MODULE
QWSPTGUI WORKSTATION PUT GRAPHICAL USER INTERFACE
QWSPTMSG WS/DM DISPLAY AN OPERATOR MESSAGE
QWSPUDDS WS PUT OF USER DEFINED DATA STREAMS
QWSPUT WS/PT PUT
QWSQRYWS QUERY WS OPTIONS ON A JOB BASIS
QWSRSCRC WS/ML MESSAGE LIGHT HANDLER
QWSRST QWSRST - WORKSTATION RESTORE MODULE
QWSRSTSC RESTORE SCREEN AFTER INVOCATION
QWSRTSFL SFL ROLL/FLOD/TRUNCATE HANDLER
QWSSETWS SET WS OPTIONS ON A JOB BASIS
QWSSFLCT SFL CONTROL RECORD FUNCTIONS
QWSSNDSC WORKSTATION SEND SCOPE MESSAGE
QWSSPEND WS/SP FILE SUSPEND
QWSSRPGM QWSSRPGM
QWSSYSRQ WS SIGNAL SYSTEM REQUEST EVENT
QWSUIEH WS/UI UNSOLICITED INPUT EVENT HANDLER
QWSWINCT WS WINDOW CONTROL MODULE
QWTAESRQ ARBITER DEVICE RELATED HANDLER
QWTAEVRY REQUEST FROM DST TO VARY ON CONSOLE
QWTAMABT MONITOR ABNORMAL TERMINATION ROUTINE
QWTAMCJS CREATE TEMPORARY JOB STRUCTURES
QWTCCBCI INITIATE BATCH IMMEDIATE JOB
QWTCCCHG CHANGE GROUP ATTRIBUTES
QWTCCCHJ CHANGE JOB COMMAND PROCESSING PROGRAM
QWTCCCNJ CANCEL JOB COMMAND PROCESSING PROGRAM
QWTCCCPA INITIATE BATCH IMMEDIATE JOB
QWTCCDPJ DISPLAY ACTIVE PJ CPP
QWTCCDSC DISCONNECT COMMAND PROGRAM
QWTCCEPJ END PRESTARTED JOB CPP
QWTCCHDJ HOLD JOB COMMAND PROCESSING PROGRAM
QWTCCJOB JOB COMMAND PROCESSING PROGRAM
QWTCCRLJ RELEASE JOB COMMAND PROCESSING PROGRAM
QWTCCRRJ REROUTE JOB COMMAND PROCESSING PROGRAM
QWTCCRTN RETURN COMMAND PROCESSING PROGRAM
QWTCCRVG RETRIEVE GROUP ATTRIBUTES
QWTCCSBJ SUBMIT JOB COMMAND PROCESSING PROGRAM
QWTCCSPJ START PRESTARTED JOB CPP
QWTCCSRQ QWTCCSRQ - TFRSECJOB CPP
QWTCCSTA SETATNPGM CPP
QWTCCTBJ TRANSFER BATCH JOB COMMAND PROGRAM
QWTCCTFG TRANSFER GROUP JOB COMMAND PROCESSOR
QWTCCTFJ TRANSFER JOB COMMAND PROGRAM
QWTCCTRG TERMINATE GROUP JOB COMMAND PROCESSOR
QWTCLNUP MONITOR CLEANUP ROUTINE
QWTCTLTR CONTROL EARLY TRACING API
QWTDMPFR DUMP XPF FLIGHT RECORDER MODULE
QWTDMPLF DUMP VLIC LOCK FLIGHT RECORDER
QWTLCALC ALLOCATE MSCP CONVERSATIONS
QWTLCAMS ALLOCATE MODE TO SUBSYSTEM
QWTLCATT LU SERVICES ATTACH MANAGER
QWTLCDMA DYNAMIC MODE ADDITION″
QWTLCRDT CREATE LU SERVICES DEVICE TABLE
QWTLCVOF VARY OFF PEER DEVICE
QWTLEARM ATTACH RQST MAX EXCEEDED EVENT HANDLER
QWTLECEM CANCEL SELECTED EVENT MONITORS
QWTLEDRQ LUS DEVICE REQUEST EVENT HANDLER
QWTLEOBD OBTAIN EVENT HANDLER
QWTLEOLK OBJECT LOCKED EVENT HANDLER
QWTMCACE ALLOCATE COMMUNICATION ENTRY
QWTMCAJE QWTMCAJE MODULE
QWTMCATT QWTMCATT MODULE
QWTMCAUF ADD UFCB ENTRY TO SBS FILE TABLE
QWTMCCPJ CREATE PRESTARTED JOBS
QWTMCDCE DEALLOCATE COMMUNICATION ENTRIES
QWTMCDFT CREATE MONITOR DEVICE AND FILE TABLE
QWTMCDSP DISPLAY SIGNON PROMPT
QWTMCDVX DEVICE ERROR RECOVERY HANDLING
QWTMCEOJ QWTMCEOJ MODULE
QWTMCERP ACTIVATE RESOURCE COMPLETION PROGRAM
QWTMCMNL MONITOR MAINLINE
QWTMCPPJ PROCESS PRESTARTED JOB ENTRY
QWTMCQAL JOB QUEUE ALLOCATION
QWTMCQDA DEALLOCATE JOB QUEUES
QWTMCSTD MONITOR SHUTDOWN
QWTMCSTP MONITOR STARTUP
QWTMEAST ALLOCATE STORAGE EVENT HANDLER
QWTMEATR QWTMEATR MODULE
QWTMEDDA DYNAMIC DEVICE ALLOCATION (WORKSTATION)
QWTMEINA INACTIVE WORKSTATION TIMEOUT
QWTMEJIN JOB INITIATION EVENT HANDLER/MODULE
QWTMEJQA JOB QUEUE AVAILABLE EVENT HANDLER
QWTMEOBD OBTAIN DEVICE EVENT HANDLER
QWTMEPDA PENDING DEVICE ALLOCATION HANDLER
QWTMEPJP PRESTARTED JOB POOL SIZE CONTROL
QWTMESBC SUBSYSTEM CONTROL EVENT HANDLER
QWTMESGN SIGNON DATA AVAILABLE EVENT HANDLER
QWTMESRQ SYSTEM REQUEST - MONITOR EVENT HANDLER
QWTMESTA STORAGE ALLOCATED EVENT HANDLER
QWTMETMR QWTMETMR CNLJOBABN TIMER EVENT HANDLER
QWTMETRI TRIGGER INVITE EVENT HANDLER
QWTMETRP PROCESS TERMINATION EVENT HANDLER
QWTMMALM ALLOCATE MODE TO SUBSYSTEM
QWTMMBCI INITIATE BATCH IMMEDIATE JOB
QWTMMBJT BATCH JOB TERMINATION
QWTMMCHG CHANGE GROUP ATTRIBUTES MSG PROC
QWTMMCHJ CHANGE JOB MESSAGE PROCESSOR
QWTMMCJQ CHGJOBQE MESSAGE PROCESSOR
QWTMMCME ADD/CHG/RMVCMNE MESSAGE PROCESSOR
QWTMMCNJ CANCEL JOB MESSAGE PROCESSOR
QWTMMCSD CHANGE SBS DESCRIPTION MSG PROCESSOR
QWTMMDSC SYSTEM EVENT MONITOR FOR DISCONNECT
QWTMMERH MONITOR ERROR HANDLER
QWTMMFJB FIND JOBS EVENT HANDLER
QWTMMHDJ HOLD JOB MESSAGE PROCESSOR
QWTMMIJT INTERACTIVE JOB TERMINATION
QWTMMPJE CHANGE PRESTARTED JOB ENTRY
QWTMMPJR PRESTARTED JOB READY PROCESSING
QWTMMRLJ RELEASE JOB MESSAGE PROCESSOR
QWTMMRST RESET PJ STATISTICS - EVENT HANDLER
QWTMMRTE CHANGE ACTIVE ROUTING ENTRY
QWTMMRVG RETRIEVE GROUP ATTRIBUTES MSG PROC
QWTMMSDJ MONITOR FOR DISCONNECT ANOTHER JOB
QWTMMSEP START/END PJ MESSAGE PROCESSOR
QWTMMTJT TRANSFER JOB TERMINATION
QWTMMTRG TERMINATE GROUP JOB MSG PROC
QWTMMTRS TERMINATE SUBSYSTEM MESSAGE PROCESSOR
QWTMMWSE ADD/CHG/RMVWSE MESSAGE PROCESSOR
QWTPCRJA QWTPCRJA MODULE
QWTPCSRQ SYSTEM REQUEST - SUSPEND PROGRAM
QWTPCUBP QWTPCUBP MODULE
QWTPECTL QWTPECTL
QWTPEETJ END EARLY TRACING EVENT HANDLER
QWTPIIPP QWTPIIPP MODULE
QWTPIPPP PROBLEM PHASE PROGRAM FOR PIP
QWTPITDP END OF JOB DISPLAY
QWTPITPP TERMINATION PHASE PROGRAM
QWTPMCHJ QWTPMCHJ
QWTPMCNJ CANCEL JOB MESSAGE PROCESSOR
QWTPMHDJ HOLD JOB PROCESS MESSAGE PROCESSOR
QWTPMSRQ SYSTEM REQUEST - PROCESS HANDLER
QWTPMULK UNLOCK OBJECT LOCK MESSAGE PROCESSOR
QWTSCBCI BATCH IMMEDIATE JOB IEXIT MODULE
QWTSCCMD IEXIT PROGRAM FOR DIABLING COMMAND LINE
QWTSCERP ERP RECOVERY SCREEN MODULE
QWTSCJCC JOB CONTROL CLEANUP IEXIT MODULE
QWTSCOPR ATTN KEY SCOPE HANDLER
QWTSCPJR PRESTARTED JOB READY PROCESSING
QWTSCPOP POPATTN KEY ROUTINE
QWTSCPSH PUSHATTN KEY ROUTINE
QWTSCSBJ QWTSCSBJ MODULE
QWTSCSEL TFRGRPJOB(*SELECT) MODULE
QWTSCSSM SEND CPF1269 MESSAGE
QWTSCWSE WORK STATION INTERFACE FOR DISCONNECT
QWTSEATN ATTN KEY EVENT HANDLING ROUTINE
QWTSEDTO TIMER EVENT FOR DISCONNECTED JOBS
QWTSETLF TURN ON & OFF VLIC FLIGHT RECORDER
QWTSETME CANCEL JOB TIMER EXPIRED HANDLER

QWTSETP SET PROFILE
QWTSETTR SETUP EARLY TRACING API
QWVCCDAG DISPLAY ACTIVATION GROUP CPP
QWVCCDLA DELETE ACTIVATION GROUP CPP
QWVPDAGE DESTROY ACTIVATION GROUP EXIT ROUTER
QWVPMDAG DISPLAY ACTIVATION GROUP EVENT PROCESSOR
QWVSCDTL DISPLAY DETAILS PANEL
QXFAPPC FILE SERVER TRANSACTION PROGRAM & INIT
QXICEXIT D28620
QXOMRMCA REMOVE CLASS ASSOCIATION
QYFCKLOC ASYNC CHECK LOC MODULE
QYFCLOSE ASYNC CLOSE FUNCTION
QYFERP1 ASYNC ERP1 FUNCTION
QYFERP2 ASYNC ERP2 FUNCTION
QYFGET ASYNC GET FUNCTION
QYFIOCMP ASYNC I/O COMPLETE MODULE
QYFOPEN ASYNC OPEN FUNCTION
QYFPADPT ASYNC PAD PUT MODULE
QYFPDERP ASYNC PAD ERROR RECOVERY FUNCTION
QYFPSR ASYNC PSR FUNCTION
QYFPUT ASYNC PUT FUNCTION
QYFVRYOF ASYNC VARY OFF FUNCTION
QYFVRYON ASYNC VARY ON FUNCTION
QYYCCLOS SOC VERSION OF QTSCLOSE
QYYCDTMN SOC SERVER CODE
QYYCFEOD SOC VERSION OF QTSFEOD
QYYCGETD SOC VERSION OF QTSGETD
QYYCGETK SOC VERSION OF QTSGETK
QYYCGETM SOC VERSION OF QTSGETM
QYYCGETS SOC VERSION OF QTSGETS
QYYCOPEN SOC CODE
QYYCPUT SOC VERSION OF QTSPUT
QYYCPUTD SOC VERSION OF QTSPUTD
QYYCPUTM SOC VERSION OF QTSPUTM
QYYCUDR SOC VERSION OF QTSUDR
QY1ITFAT THIS IS ATTN PROCESSING MODULE FOR ITF
QY1ITFML THIS IS ITF MAINLINE CODE
QY1ITF36 THIS IS ITF PORTION FOR S36EE
QY2FILEX APPLICATION PLMI PROGRAM
QY2FTEX FILE TRANSFER ERROR TRANSIT
QY2FTML FILE TRANSFER MAINLINE
QY2MSGX FILE TRANSFER MESSAGE HANDLER
QZCADB ZCA DATABASE MANAGMER
QZCPTRAP EUOP VIA RETAIN MODULE
QZDAFBIX QZDAFBIX
QZDAGFS SNADS GENERAL FILE SERVER API
QZDASNAC SNADS FSO ACCESS INTERFACE - ASSIGN ID
QZDASNFB QZDASNFB
QZDBLDRQ QZDBLDRQ
QZDCHGST CHANGE DISTRIBUTION QUEUE STATUS
QZDCKCND QZDCKCND
QZDCMDCF BATCH UPDATE DISTRIBUTION QUEUE TABLE
QZDCMDNM SECONDARY NODE ID COMMAND PROCESSING
QZDCMDRT ROUTING TABLE COMMAND MODULE
QZDCRDCB CREATE SNADS DCB FROM GET
QZDCRMSG CREATE MSF MESSAGE FROM SNADS DCB
QZDDDSIX QZDDDSIX
QZDDDTST SNADS DISTRIBUTE DATA AND STATUS
QZDDEQRQ QZDDEQRQ
QZDDLOG DISPLAY DISTRIBUTION LOG
QZDDSPCF DISPLAY NEXT SYSTEM TABLE
QZDDSPIX QZDDSPIX
QZDDSPNM SECONDARY NODE ID PROCESSING
QZDDSPRT ROUTING TABLE DISPLAY MODULE
QZDDSPST QZDDSPST
QZDDSPSV CPP FOR DISTRIBUTION SERVICES COMMANDS
QZDEBIN SNA/DS INBOUND EXTENDED BRIDGE
QZDEBOUT SNA/DS EXTENDED BRIDGE FUNCTION
QZDENQRQ QZDENQRQ
QZDEXTRT QZDEXTRT
QZDGATE SNADS GATEWAY SENDER
QZDGFSLR QZDGFSLR
QZDGFSRC QZDGFSRC
QZDGFSRD QZDGFSRD
QZDGFSWT QZDGFSWT
QZDINGAT SNADS INPUT FROM A GATEWAY RECEIVER
QZDINSTL SNADS INSTALL
QZDINZDQ CPP FOR INZDSTQ INIT DIST QUEUE CMD
QZDKILLQ SNADS KILL DISTRIBUTION QUEUE ENTRY
QZDLSTAC SNADS FSO ACCESS INTERFACE - LIST IDS
QZDMFCLN SNADS MAIL FRAMEWORK ATTACHMENT CLEANUP
QZDNKSF2 SNADS RECEIVER NACK/SUFFIX T2 HANDLER
QZDNQDQX QZDNQDQX
QZDRCLIX QZDRCLIX
QZDRCVDT SNADS RECEIVE DISTRIBUTE MODULE
QZDRCVIX QZDRCVIX
QZDRCVR QZDRCVR
QZDRECLM QZDRECLM
QZDRECOV QZDRECOV
QZDROUTR QZDROUTR
QZDROUTX QZDROUTX
QZDRVKAC SNADS FSO ACCESS INTERFACE - REVOKE ID
QZDSENDR QZDSENDR
QZDSFIND QUEUE - S2SQFKEY & S2SQRANG MACRO SUPP
QZDSFINX QUEUE - S2SQFINX MACRO SUPP
QZDSIEXT ZD MODULE QZDSFINX IEXIT MODULE
QZDSNDEH QZDSNDEH
QZDSNDIX QZDSNDIX
QZDSNPAC ACCOUNTING SNAP-IN FOR SNADS
QZDSNPAD ADDRESS RESOLUTION SNAP-IN FOR SNADS
QZDSNPAM ATTACHMENT MNGMT SNAP-IN FOR SNADS
QZDSNPEC ENVELOPE CONVERSION SNAP-IN FOR SNADS
QZDSNPIX SNADS SNAP-IN IEXIT ROUTINE
QZDSNPLD LOCAL DELIVERY SNAP-IN FOR SNADS FS1
QZDSNPMF MESSAGE FORWARDING SNAP-IN FOR SNADS FS1
QZDSNPND NON-DELIVERY SNAP-IN FOR SNADS FS1
QZDSNPOC OBJECT CONVERSION SNAP-IN FOR SNADS
QZDSOPRD OPERATIONS DELETE DISTR QUEUE ENTRY
QZDSQCLN CLEAN UP SNADS QUEUE INDEX ENTRIES
QZDSTGAT START SNADS GATEWAYS
QZDSTRIE QZDSTRIE
QZDSTRUP QZDSTRUP
QZDSTSND QZDSTSND
QZDTIMEH QZDTIMEH
QZMF QZMF HEADER IN ILE/COBOL
QZMF QZMF API HEADER FOR CBL
QZMF QZMF API HEADER IN RPG
QZMF QZMF HEADER IN ILE/RPG
QZMFACHG ZMF CHANGE MAIL MESSAGE API
QZMFACRT ZMF CREATE MAIL MESSAGE API
QZMFADDC ADD MAIL SERVICES FRAMEWORK CFG API
QZMFAIXT ZMF API MODULES QZMFAXXX IEXIT MODULE
QZMFALOG ZMF MODULE QZMFALOG DSP LOG DATA
QZMFAPG1 ZMF MODULE QZMFAPG1 - EXTRA API PROGRAM
QZMFAQRY ZMF QUERY MAIL MESSAGE API
QZMFARSV ZMF MODULE QZMFARSV RSV MSGID
QZMFARTV ZMF RETRIEVE MAIL MESSAGE API
QZMFASCR ZMF MODULE QZMFASCR SCRATCH MSGID
QZMFASQC ZMF MODULE QZMFASQC SEND SEQ COMPL
QZMFASRV QZMFASRV HEADER IN ILE/COBOL
QZMFASRV ZMF API ILE SERVICE PROGRAM
QZMFASRV QZMFASRV HEADER IN ILE/RPG
QZMFBEIX BIG E INVOCATION EXIT PROGRAM
QZMFBIGE OEDS FRAMEWORK PROGRAM
QZMFCATR ZMF MODULE QZMFCATR CONFIG ATTRIBUTES
QZMFCAXP ZMF MODULE QZMFCAXP ADD EXIT POINT CHECK
QZMFCAXR ZMF MODULE QZMFCAXR ADD EXIT POINT CHECK
QZMFCAXT ZMF MODULE QZMFCAXT ADD EXIT PT TYPE CHK
QZMFCOPN FIRST TOUCH INSTALL OF MSF TYPES
QZMFDLTC DELETE MAIL SERVICS FRAMEWORK CFG API
QZMFEEND ENDMAILFRM CPP
QZMFESIX INVOCATION EXIT PGM FOR STRMAILFRM CPP
QZMFESTR STRMAILFRM CPP
QZMFLSTC LIST MAIL SERVICES FRAMEWORK CFG API
QZMFSNPA GENERAL ADDRESS RESOLUTION SNAP-IN
QZMFTINT INITIALIZE MAIL SERVER INTERNAL CONFIG
QZMFTIXT IEXIT OF MAIL SERVER CONFIG PGM QZMFTINT
QZMFXCLN ZMF MODULE QZMFXRCL SPACE CLEANUP
QZMFXFNQ ZMF MODULE QZMFXFNQ UTIL GET PTR TO QUEU
QZMFXFNX ZMF MODULE QZMFXFNX UTIL GET PTR TO INDX

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QZMFXGSQ  ZMF MODULE QZMFXGSQ UTIL GET/SET SEQ#
QZMFXIPL  ZMF MODULE QZMFXRCL IPL TIME FUNCTIONS
QZMFXIXT  ZMF MODULE QZMFXFNX IEXIT MODULE
QZMFXKQ   ZMF MODULE QZMFXKQ UTIL KILL SPACE
QZMFXNDQ  ZMF MODULE QZMFXNDQ UTIL ENQ/DEQ MSG QUE
QZMFXPG1  ZMF MODULE QZMFXPG1 - EXTRA UTIL PROGRAM
QZMFXPG2  ZMF MODULE QZMFXPG2 - EXTRA UTIL PROGRAM
QZMFXPG3  ZMF MODULE QZMFXPG3 - EXTRA UTIL PROGRAM
QZMFXPG4  ZMF MODULE QZMFXPG4 - EXTRA UTIL PROGRAM
QZMFXPG5  ZMF MODULE QZMFXPG5 - EXTRA UTIL PROGRAM
QZMFXPIN  ZMF MODULE QZMFXPIN INIT/CRT ZMF SP POOL
QZMFXQIN  ZMF MODULE QZMFXQIN INIT/CRT MESSAGE QUE
QZMFXRCL  ZMF MODULE QZMFXRCL RCLSTG TIME FUNCTION
QZMFXSPF  ZMF MODULE QZMFXSPF UTIL SPACE POOL MNG2
QZMFXSPM  ZMF MODULE QZMFXSPM UTIL SPACE POOL MNGR
QZMFXSPX  ZMF MODULE QZMFXSPM IEXIT MODULE
QZMFXSXT  ZMF MODULE QZMFXGSQ IEXIT MODULE
QZPAIEND  MPTN END NAMEMAPPER JOB
QZPAIJOB  MPTN NAMEMAPPER JOB
QZPAISTR  MPTN START NAMEMAPPER JOB
QZPAIXIT  MPTN NAMEMAPPER JOB EXIT ROUTINE
QZPDOCE1  SPECIAL PTF EXIT PROGRAM FOR DOCUMENTS
QZPIEXIT  DOCUMENT PTF INVOCATION EXIT
QZPPTFDI  BUILD PTF DOCUMENT INDEX
RTNWORD   FROM PC LEXAM MERGE CODE
SCHUML    FROM PC LEXAM MERGE CODE
SORTIT    FROM PC LEXAM MERGE CODE
SPRABRT   NON-C PRTMGRABORT STUB
SPRADDF   NON-C PRTMGRADDFILE STUB
SPRADOC   NON-C PRTMGRABORTDOC STUB
SPRCLOS   NON-C PRTMGRCLOSE STUB
SPREDOC   NON-C PRTMGRENDDOC STUB
SPRFERI   NON-C PRTMGRFREEERRORINFO STUB
SPRGEEM   NON-C PRTMGRGETEXTERRORMSG STUB
SPRGERI   NON-C PRTMGRGETERRORINFO STUB
SPRINIT   NON-C PRTMGRINITIALIZE STUB
SPRLOPT   NON-C PRTMGRLISTOPTIONS STUB
SPROPEN   NON-C PRTMGROPEN STUB
SPRQOPT   NON-C PRTMGRQUERYOPTION STUB
SPRSDOC   NON-C PRTMGRSTARTDOC STUB
SPRSOPT   NON-C PRTMGRSETOPTION STUB
SPRTERM   NON-C PRTMGRTERMINATE STUB
SPRWRIT   NON-C PRTMGRWRITE STUB
SRCHDCT2  AS/400 SPECIFIC SRCHDCTC
SUBRA1    ASYNC RPG/COBOL SUBROUTINE
SUBRF1    FILE TRANSFER COBOL SUBROUTINE
SUBRF2    FILE TRANSFER RPG SUBROUTINE
SUBR30    S/36 RPGII INTERFACE TO CRYPTOGRAPHY
SUBR31    S/36 COBOL INTERFACE TO CRYPTOGRAPHY
SUBR50    RPG PRINTER OPTION SUBROUTINE
SUBR51    RPG BARCODE OPTION SUBROUTINE
SUBR52    RPG GRAPHICS OPTION SUBROUTINE
TABLES    FROM PC LEXAM MERGE CODE
TEADDPG   ADD PROGRAM FOR NPT DEBUGGER
TEADDVD   ADD_VIEW_DESCRIPTION API
TEADDVF   ADD_VIEW_FILE API
TEADDVM   ADD_VIEW_MAP API
TEADDVT   ADD_VIEW_TEXT API
TEAPIIF   COMMON API INTERFACE CODE
TECMDS    NPT COMMAND PARSING ROUTINES
TEDBGIS   DEBUG INTERFACE SERVICE PROGRAM
TEDBLDLL  DUMP API - BUILD LINK LIST
TEDBLDRV  DUMP API - BUILD RECEIVER VARIABLE
TEDDMPV   DUMP MODULE VARIABLES API
TEDELPG   DELETE PROGRAM ROUTINE FOR NPT DEBUGGER
TEDEXCH   DUMP API EXCEPTION HANDLING ROUTINES
TEDRTVDD  DUMP API - RETRIEVE DEBUG DATA
TEDUMPV   VIEW DUMP CODE
TEENDDB   END_SOURCE_DEBUG API
TEENDVC   END_VIEW_CREATION API
TEEXCH    C EXCEPTION HANDLING ROUTINES
TELBKP    SUPPORT ROUTINES FOR BREAKPOINT LIST
TELMODL   NPT LINKED LIST ROUTINES FOR MODULE DATA
TELPGM    NPT LINKED LIST ROUTINES FOR PGM DATA
TELVIEW   LINKED LIST ROUTINES FOR VIEW DATA
TEMALLC   MALLOC AND FREE FOR NPT DEBUGGER
TEMAPVP   MAP_VIEW_POSITION API
TEMPSPI   MAPPING FUNCTIONS
TENTWRK   CREATE VIEW NETWORK TABLE CODE
TEREGDV   REGISTER_DEBUG_VIEW API
TERMVDV   REMOVE_DEBUG_VIEW API
TERTCMD   VIEW CACHE SUPPORT ROUTINES
TERTVDA   RETRIEVE_DEBUG_ATTRIBUTE API
TERTVMV   RETRIEVE_MODULE_VIEW API
TERTVSP   RETRIEVE_STOPPED_POSITION API
TERTVVF   RETRIEVE_VIEW_FILE API
TERTVVT   RETRIEVE_VIEW_TEXT API
TESBMDC   SUBMIT DEBUG COMMAND API IMPLEMENTATION
TESBRK    BREAKPOINT LIST SCREEN C ROUTINES
TESCAPI   SHORTCUT APIS
TESCREN   SCREEN HANDLER FOR NPT DEBUGGER
TESDBGO   DEBUG OPTIONS SCREEN C ROUTINES
TESDMSG   SUPPORT ROUTINES FOR SENDING MESSAGES
TESETDA   SET_DEBUG_ATTRIBUTE API
TESEVAL   EVALUATE EXP SCREEN C ROUTINES
TESPACE   SYMBOL TABLE SPACE MANAGEMENT
TESPGM    PROGRAM LIST SCREEN C ROUTINES
TESSRC    NPT PROGRAM SOURCE SCREEN C ROUTINES
TESTRDB   START_SOURCE_DEBUG API
TESTRVC   START_VIEW_CREATION API
TESVIEW   VIEW SELECTION LIST C ROUTINES
TESYAPI   SYMBOL TABLE API
TESYERR   SYMBOL TABLE ERROR MANAGEMENT
TESYSPI   SYMBOL TABLE SPI - 1ST PHASE
TESYTBL   SYMBOL TABLE SPI - 2ND PHASE
TETRACE   SOURCE DEBUGGER TRACE MANAGER
TEVIEW    COMMON VIEW CODE
TEVIEWC   VIEW CACHE SUPPORT ROUTINES
TEXGATE   PARSER PRODUCED BY YACC
TEXGCON   TRANSLATOR CONSTANTS MANAGER
TEXGCVT   TRANSLATOR CONVERSIONS MANAGER
TEXGDCD   TRANSLATOR DCODE MANAGER
TEXGERR   TRANSLATOR ERROR MANAGER
TEXGEXP   TRANSLATOR EXPRESSIONS MANAGER
TEXGEXPD  DEBUGGER MACRO PREPROCESSOR
TEXGFLS   TRANSLATOR FIELD LIST MANAGER
TEXGMAP   TRANSLATOR LINE NUMBER MANAGER
TEXGNTP   DEBUG INTERPRETER INVOCATION MANAGER
TEXGNVC   INVOCATION POINTER RETRIEVAL MANAGER
TEXGPXP   INVOCATION POINTER RETRIEVAL MANAGER
TEXGRES   TRANSLATOR RESULTS BUFFER MANAGER
TEXGSTK   TRANSLATOR PARSE STACK MANAGER
TEXGSTM   TRANSLATOR STATEMENT SEMANTICS
TEXGSTR   TRANSLATOR RESULT RECORD STRING MANAGER
TEXGSYM   TRANSLATOR SYMBOL TABLE INTERFACE
TEXGTMP   TRANSLATOR SYMBOL TABLE INTERFACE
TEXGTRC   PARSE TRACE GENERATOR
TEXGTYP   TYPE CHECKER
TEXGXPR   TRANSLATOR EXPRESSION SEMANTICS
TEXLATE   PARSER PRODUCED BY YACC
TEXLCAS   TYPE CASTING SEMANTICS
TEXLCON   TRANSLATOR CONSTANTS MANAGER
TEXLDCD   TRANSLATOR DCODE MANAGER
TEXLERR   TRANSLATOR ERROR MANAGER
TEXLEXP   TRANSLATOR EXPRESSIONS MANAGER
TEXLFLS   TRANSLATOR FIELD LIST MANAGER
TEXLMAP   TRANSLATOR LINE NUMBER MANAGER
TEXLNTP   DEBUG INTERPRETER INVOCATION MANAGER
TEXLNVC   INVOCATION POINTER RETRIEVAL MANAGER
TEXLPXP   INVOCATION POINTER RETRIEVAL MANAGER
TEXLRES   TRANSLATOR RESULTS BUFFER MANAGER
TEXLSTK   TRANSLATOR PARSE STACK MANAGER
TEXLSTM   TRANSLATOR STATEMENT SEMANTICS
TEXLSTR   TRANSLATOR RESULT RECORD STRING MANAGER
TEXLSYM   TRANSLATOR SYMBOL TABLE INTERFACE
TEXLTMP   TRANSLATOR SYMBOL TABLE INTERFACE
TEXLTRC   PARSE TRACE GENERATOR
TEXLTYP   TYPE CHECKER
TEXLXPR   TRANSLATOR EXPRESSION SEMANTICS
TOPUIAFC  COBOL UIM APPLICATION FORMAT EXIT
```

```
TOPUICPC  COBOL UIM CUSROSR SENSITIVE EXIT
TOPUIFKC  COBOL UIM FUNCTION KEY CALL
TOPUIGEC  COBOL UIM GENERAL PANEL EXIT
TOPUIILC  COBOL UIM INCOMPLETE LIST EXIT
TOPUILEC  COBOL UIM LIST/PULL-DOWN OPTION EXIT
TOPUILOC  COBOL UIM LIST/PULL-DOPWN OPTION CALL
TOPUIMIC  COBOL UIM MENU ITEM CALL
USEREXIT  DEFAULT SOURCE FILE FOR NLPS USER EXIT
VERIFY2   FROM PC LEXAM MERGE CODE
VERUTIL   FROM PC LEXAM MERGE CODE
```

B.1 AS/400 Client Access/400 Modules (Partial List)

```
QTFTDWNLD    Original client data transfer
QRQSRVX      Remote SQL: V2R2,later PCS/400 and CA/400 original clients
QRQSRV0      Remote SQL: pre V2R2  PCS/400 clients, commitment ctl=*NONE
QRQSRV1      Remote SQL: pre V2R2  PCS/400 clients, commitment ctl=*ALL
QHQRTRGT     Original client data queue requests
QMFRCVR      Original client message receiver
QMFSNDR      Original client message sender
QLZPSERV     Original client license management requests
QVPPRINT     Virtual print for original, CA/400 Windows 3.1 clients
DDM job      Submit remote command: original, CA/400 Windows 3.1 clients
QPWFSERVER   File server autostart job: Original and new clients
QPWFSERV     Main file server for each user
QPWFSTP0     Transaction program for original clients
QPWFSTP1     Transaction program for CA/400 optimized OS/2 client
QPWFSTP2     Transaction program for CA/400 Windows 3.1 client
QPWFSTP2     Transaction program for CA/400 Windows 3.1 client
QPWFSERVSO   File server for sockets
QPWFSERVSD   File server Daemon for sockets
QZDAINIT     Main program for all database server requests (eg ODBC)
QZDACMDP     Database server command processor (does all I/O to client)
QZDANDB      Program for native file database requests
QZDAROI      Database server requests for object information requests
             and SQL catalog functions (eg table/column definitions)
QZDASQL      Database server for SQL requests (will call QQQ programs)
QZDASOINIT   Database server for sockets
QZDASON2     Database server for sockets setup
QZDASRVSD    Database server daemon for sockets
QZHQTRG      Data queue requests for CA/400 Optimized OS/2, Windows95
QZHQSSRV     Data queue server sockets: CA/400 Optimized OS/2, Windows95
QZHQSRVD     Data queue daemon sockets: CA/400 Optimized OS/2, Windows95
QNPSERVR     Print server: CA/400 Optimized OS/2, Windows95
QNPSERVS     Print server sockets: CA/400 Optimized OS/2, Windows95
QNPSERVD     Print server daemon: CA/400 Optimized OS/2, Windows95
QZSCSRVR     Central server APPC: license/client management/EBCDIC-ASCII
             conversions for CA/400 Optimized, Windows95 clients
QZSCSRVS     Central server sockets: license/client management/EBCDIC-
             ACCII conversions for CA/400 Optimized, Windows95 clients
QZSCSRVD     Central server daemon: license/client management/EBCDIC-
             ASCII conversions for CA/400 Optimized, Windows95 clients
QZRCSRVR     Remote Command,Distributed Call APPC: for
             CA/400 Optimized OS/2dows95 clients
QZRCSRVS     Remote Command,Distributed Call socket: for
             CA/400 Optimized OS/2, Windows95 clients
QZRCSRVSD    Remote Command,Distributed Call daemon: for
             CA/400 Optimized OS/2, Windows95 clients
QACSOTP      APPC password sign on: for original, CA/400 Windows 3.1
             CA/400 Optimized OS/2,
QZSOSIGN     Socket sign on: for original, CA/400 Windows 3.1
             CA/400 Optimized OS/2, Windows95 clients
QZSOSIGND    Socket sign on daemon: for original, CA/400 Windows 3.1
             CA/400 Optimized OS/2, Windows95 clients
```

Appendix C. AS/400 LIC Tasks (Partial List)

This section contains a partial list of AS/400 RISC systems LIC tasks. Use this information to determine what functions a ″high CPU″ LIC task may be performing. Note that these functions may be normal rather than indicate a software defect problem. Refer to *AS/400 Licensed Internal Code Diagnostic Aids*, LY44-4900, for more information.

Table 18 (Page 1 of 3). Partial Listing of AS/400 LIC Tasks

Task Name	Task Description
AMxxxxx	Communications Answer Manager
AUxxxxxx	Authority Manager
ASCL-xxxxxx	Asynchronous Line IOM
ASCS-xxxxxx	Asynchronous Station IOM
BMxxxxxx	Bus Manager
CFxxxxx	Common Functions
- CFINTn	Task Dispatching Interrupt Handler (1 per processor. Consumes ″high″ CPU as interactive work grows on server models)
CPxxxxxx	Data Compression/Decompression
CRxxxxxx	Cryptographic Support
DBxxxxx	Database
- DBDOU	Database out of use task for removing objects no longer in use from the internal ″database in use″ table
- DBIOnn	Database storage management (1 per DASD unit)
- DBL2nn	Database level 2 server task (1 per DASD unit, max of 128)
- DBL3nn	Database level 3 server task (1 per DASD unit, max of 128)
DDI-line name	FDDI, DDI Line IOM varied on
DDxxxxxx	DASD Driver
DMxxxxx	DASD Management
DSTxxxx	Dedicated Service Tool Task
- DSTMAIN	Dedicated Service Tool Main Task
ELxxxxx	Error Logging
- EL-ERRLOG	Error Logging Task (1 per system)
EMxxxxxx	Event Management
ETH-ethernet line name	Ethernet Line IOM varied on
FAX-line name	FAX Line IOM varied on
FPxxxxxx	FSIOP(IPCS) Support Tasks
FR-line name	Frame Relay Line IOM varied on
FSnnnnn	Shared Folder Task (1 per Client Access controller using shared folder support)
IIxxxxx	Independent Index Support (database, message queue, etc.)
IOcccccc	I/O Task of Various Functions
- IOPxxxxx	IOP Object Tasks
- IOSTATSTASK	Services MI Requests for LIC Maintained I/O Statisics

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Table 18 (Page 2 of 3). Partial Listing of AS/400 LIC Tasks	
Task Name	**Task Description**
- IOTxxxxx	Tape Device Scheduler and Driver Object
IPxxxxx	Interprocess Tasks
- IPSRVCbbuu-tttt	Interprocess Communication Support Service Controller Task (1 per IOP). For bbuu-tttt, explanation, see IPRnggbbuu-tttt description.
- IPnggbbuu-tttt	Interprocess Communication Support Multiple Router Task (1 or more per IOP). n = router task number or C for communications support gg = logical connection group bb = system bus number uu = logical address of IOP on the bus (00-31) tttt = IOP type (2617=ELAN, 2619=TRLAN, 9162/9163=MFIOP, 6050=local WSC, 6512=DASD Controller, etc.)
ISDN-line name	ISDN Line IOM varied on
JOxxxxxx	Journal Management (includes SMAPP support)
LCxxxxx	APPN Services Task Support
LDxxxxxx	Load/Dump (Save/Restore) Tasks
LMxxxxx	Location Manager
LOxxxxx	Local Sockets
LWS-station name	Local Workstation Control Unit Name varied on (CTL01 is first WSC)
MCxxxxxx	Machine Check Logging
MNxxxxxx	Context (library) Management
MNTASK	Contact Management Service Task
MSCP	Machine Services Control Point (Vary on, Vary off processing, line/controller/device description creation/deletion)
ND-station name	Network Remote Workstation Support (1 per 5394 or 5494 control unit name varied on)
NMxxxxx	Network Management Services
NUxxxxxx	SSP Emulator
OTxxxxx	Open Station (control unit) I/O Manager (IOM)
- OT-open station name	Open Station (control unit name) IOM varied on
PAxxxxx	Display Station Pass-Through Tasks
- PA-device name	3270 Data Stream Pass-Through (3270 display through AS/400 to remote system) (1 per active issued STREML3270 command on device name)
- PA-I-nnnn	Display Station Pass-Through Intermediate Task (1 per intermediate session)
- PA-S-device name	Display Station Pass-Through Source Task (1 per pass-through session from device name issuing STRPASTHR)
- PA-T-device name	Display Station Pass-Through Target Task (1 per pass-through session. device name is target system QPADEVnnnn virtual display device)
PDxxxxxx	Performance Data Collection
P0xxxxxx	POSIX (UNIX) Support
- P0FBAITnn	Byte Stream File Tasks (2 or more)
QMxxxxx	Queue Management
RAxxxxx	3270 Remote Attach/DHCF Data Translation Task

Table 18 (Page 3 of 3). Partial Listing of AS/400 LIC Tasks	
Task Name	**Task Description**
RCxxxxx	Reclaim Function Tasks
RMxxxxx	Resource Management row.
- RmTmSafeTask	A timer task that services LIC timer function requests that are not handled by an interrupt handler task already in main storage
- RMSRVCTKLO	Resource Management Services
RTxxxxxx	Run Time Support
SDLC-line name	SDLC Line IOM varied on
SKxxxxx	I/O Stream Management (communications buffer management)
- SK-ASCnnn, SK-ASCnnnP	Communications Asynchronous Buffer Management
SMxxxxx	Storage Management Tasks
- SMASMDRTASKMGR	Directory Recovery (1 per DASD unit)
- SMPOnnnn	Storage Management Page Out Task (many tasks, as needed)
- SMSWAINSnn	Storage Management Save While Active (as needed)
- SMDSTASKnn	Storage Management Save/Restore or FSIOP initializaton (2 or more)
- SMASPTASK	Storage Management ASP Managment
- SMMIRRORccccc	Storage Management ASP Mirroring Managment
- SMSTRIPEWATCHDOG	DASD Mirroring Monitor Task
SMXCSPRVSR	Expert Cache Supervisor
SMXCAGERnn	Expert Cache Task (1 per *CALC shared pool)
SNAP	SNA Pass-Through
TAxxxxx	Tape Management
TDxxxxx	Task Dispatching
TRN-line name	Token Ring LAN Line IOM varied on
TOxxxxx	TCP/IP Support
- TONAMTASK	TCP/IP Network Access Manager (1 per system)
TS-station name	Workstation Control Unit Name IOM (1 per station (controller description) varied on)
T1xxxxx	T1 P1 Line IOM
T2xxxxx	APPC (PU Type 2) Station (control unit) IOM
- T2-APPC station name	APPC Control Unit Name IOM (1 per station varied on)
VLxxxxx	LIC Log (VLOG) Task
- VLTASK	LIC Log Task
VTMTSK	Virtual Terminal Manager
WLS-line name	Wireless Line IOM varied on
XMxxxxxx	SPD Bus Tasks
- XMSPDBUSbb	SPD Bus Task where bb=bus number (1 per bus)
- XMSIOBUbb	SPD Bus IOBU Task. where bb=bus number (1 per bus)
ZSPxxxx	IPX/SPX Communications

Appendix D. Performance Explorer PTF Summary

This appendix contains a summary of all Performance Explorer PTFs known to be available as of February, 28, 1997. Two tables are included, one for V3R6 and one for V3R7.

Some of these PTFs are the ones needed to obtain the Enhanced PEX TRACE support, while others are fixes to general Performance Explorer functions, such as STATS and PROFILE and standard TRACE support.

Both release tables contain a PTF that enables ″extended PEX TRACE″ support that provides additional PEX definitions for standard PEX TRACE support. See PTF SF38949 and PTF SF33744.

You must contact your IBM software service provider to get the ″latest performance PTF″ list, especially for PTF supersedes.

D.1 PEX PTFs for V3R6

Table 19 (Page 1 of 3). V3R6 Extended/Enhanced PEX TRACE Function PTFs (Real and ″Fake″)

PTF Number	Library Name	Description of Contents
MA13057	QYPINT	A SAVLIB of library QYPINT. This contains a full-function ADDPEXDFN command and Enhanced PEX Trace menus PEXTRC01 and PEXTRC02. This includes the Storage Management Trace (SMTBCH) command that assists in defining a trace collection tailored to your collection requirements.
MA13058	SMTRACE	Part one of three *SAVFs that contain the objects in library SMTRACE. This PTF and the following two PTFs (MA13059 and MA14450) must be restored as objects (RSTOBJ command) into library SMTRACE that you must have previously created. The support contained here provides additional reports, queries, and data summaries to assist with the analysis of collected Enhanced PEX TRACE data. These reports are grouped according to the type of problem being investigated. For example, reports relating to page faulting are now available from the new Faults (FLTS) command on the new PEX Reports Menu PEXTRC02. **All three save files (*SAVF) must be restored for proper function.**
MA13059	SMTRACE	Part two of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
MA14450	SMTRACE	Part three of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
MF11593 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF12290 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.

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Table 19 (Page 2 of 3). V3R6 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")		
PTF Number	**Library Name**	**Description of Contents**
MF12309 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF09615 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10062 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10845 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10856 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10867 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF10868 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF11015 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF14622 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF14447 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions. This PTF applies to PEX STATS HIER reports and removes the "*Alias" Call Level entry for ILE programs on the PRTPEXRPT report for a STATS HIER collection. When *Alias entries are *not included* in the report, Call Level values are as the programmer expects them to be.
SF35974 to 5716-PT1	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions. This ensures that PRTPEXRPT command detail output prints *CPU milliseconds used* rather than CPU run cycles. This PTF has been superseded by SF37834. SF35974 is documented here since the cover letter to SF37834 does not describe the change to the CPU run cycle value.

Table 19 (Page 3 of 3). V3R6 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")

PTF Number	Library Name	Description of Contents
SF37834 to 5716-PT1	--------	This is a real PTF. Make sure you have this PTF applied before running STATS and Enhanced PEX TRACE collection and reporting functions. It supersedes PTF SF35974 and adds support to disable the attempt to remove PEX data collection overhead from the total CPU utilized (applications and PEX overhead) during the collection time. Without this PTF, PEX STATS and PEX TRACE output may erroneously indicate program cumulative CPU utilization is greater than 100% or a program is shown as using less CPU utilization than it actually consumed and does not appear towards the top of the report when sorted in descending cumulative CPU utilization order. With the PTF applied, PEX overhead is not removed. You can tell this PTF (or its supersedes) has been applied if a Partition Section of a PRTPEXRPT report no longer shows *Overhead Removed* or *Total Raw CPU* values: `Total Raw CPU . . :  2756288 <- dropped` `Overhead Removed. :  220397 <- dropped` `Total CPU . . . . :  2535891 <- 2756288` `Task CPU. . . . . :  135184  05.3 %` `Job CPU . . . . . :  2400707  94.7 %` `----------` `Pgm/Mod CPU. . :  xxxxxxx  mm.m %` `Unknown CPU. . :  yyyyyyy  nn.n %` As of February 28, 1997, there is no projected availability date for a PTF to re-enable overhead removal. Please use the DSPPFM FILE(QAPZCOVER) MBR(QSF37834) to review full details.
SF35964 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF35964) to review the details.
SF29899 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF29899) to review the details.
SF28949 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF28949) to review the details. **This PTF provides the "extended standard PEX TRACE definitions"** described in Table 2 on page 126.
SF28154 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF28154) to review the details.

Table 20 (Page 1 of 2). V3R7 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")

PTF Number	Library Name	Description of Contents
MA14697	QYPINT	A SAVLIB of library QYPINT. This contains a full-function ADDPEXDFN command and Enhanced PEX Trace menu PEXTRC01 and menu PEXTRC02. This includes the Storage Management Trace (SMTBCH) command that assists in defining a trace collection tailored to your collection requirements.
MA14698	SMTRACE	Part one of three *SAVFs that contain the objects in library SMTRACE. This PTF and the following two PTFs (MA14699 and MA14700) must be restored as objects (RSTOBJ command) into library SMTRACE that you must have previously created. The support contained here provides additional reports, queries, and data summaries to assist with the analysis of collected Enhanced PEX TRACE data. These reports are grouped according to the type of problem being investigated. For example, reports relating to page faulting are now available from the new Faults (FLTS) command on the new PEX Reports Menu PEXTRC02. **All three save files (*SAVF) must be restored for proper function.**
MA14699	SMTRACE	Part two of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
MA14700	SMTRACE	Part three of the SAVFs that contain the necessary objects in library SMTRACE. **All three save files (*SAVF) must be restored for proper function.**
SF33744 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF33744) to review the details. **This PTF provides the "extended standard PEX TRACE definitions"** described in Table 2 on page 126.
SF35321 to 5716-SS1	-------	This is a real PTF. Please use DSPPFM FILE(QAPZCOVER) MBR(QSF35321) to review the details.

Table 20 (Page 2 of 2). V3R7 Extended/Enhanced PEX TRACE Function PTFs (Real and "Fake")

PTF Number	Library Name	Description of Contents
SF38029 to 5716-PT1	-------	This is a real PTF. Make sure you have this PTF applied before running STATS and Enhanced PEX TRACE collection and reporting functions. It adds support to disable the attempt to remove PEX data collection overhead from the total CPU utilized (applications and PEX overhead) during the collection time. Without this PTF, PEX STATS and PEX TRACE output may erroneously indicate program cumulative CPU utilization is greater than 100% or a program is shown as using less CPU utilization than it actually consumed and does not appear towards the top of the report when sorted in descending cumulative CPU utilization order. With the PTF applied, PEX overhead is not removed. You can tell this PTF (or its supersedes) has been applied if a Partition Section of a PRTPEXRPT report no longer shows *Overhead Removed* or *Total Raw CPU* values: `Total Raw CPU . . :  2756288 <- dropped` `Overhead Removed. :  220397 <- dropped` `Total CPU . . . . :  2535891 <- 2756288` `Task CPU. . . . . :  135184  05.3 %` `Job CPU . . . . . :  2400707  94.7 %` `----------` `Pgm/Mod CPU. . :  xxxxxxx  mm.m %` `Unknown CPU. . :  yyyyyyy  nn.n %` As of February 28, 1997, there is no projected availability date for a PTF to re-enable overhead removal. Please use the DSPPFM FILE(QAPZCOVER) MBR(QSF38029) to review full details.
MF13355 to SLIC	-------	This is included in V3R7 GA code. No need to apply.
MF13420 to SLIC	-------	This is a real PTF.
MF14469 to SLIC	--------	This is a real PTF. Make sure you have this PTF applied before running Enhanced PEX TRACE collection and reporting functions.
MF14263 to SLIC	-------	This is a real PTF.

Appendix E. Performance Explorer Tables

This appendix contains a set of tables used in various redbook chapters. The tables are placed here for easier access when doing performance problem analysis.

1. Enhanced PEX TRACE Collection and Report Cross-Reference
2. Physical Disk I/O TRACE Mnemonics
3. MI Object Types
4. File Opens per Second Guidelines
5. Activation Group Creates per Second Guidelines

E.1 Enhanced PEX TRACE Data Collection-Report Options

This table lists the Problem Type data collection values and the associated reports for each Problem Type value.

Table 21 (Page 1 of 2). Enhanced PEX TRACE Data Collection and Reporting Options

Data to Collect for SMTBCH Command "Problem Type"	**Report Menu Option Available on PEXTRC02 Menu**	**Reporting Command**
Performance[1] *PERF[3]	01. Full File Opens[1] 02. Physical Disk IO[1] 03. Activation Group Creates 04. Faults 05. Disk Space Consumption[2] 06. Address Consumption[2] 07. Size of Objects used During Pextrace Collection 08. CPU Utilization 09. Program Activations and Deactivations	OPENS IOS ACTGRP FLTS NETSIZE ADDR OBJSIZE PRTPEXCPUB DEACTS
Performance *DASDPERF1[5]	02. Physical Disk IO[5] 07. Size of Objects used During Pex Trace Collection 08. CPU Utilization	IOS OBJSIZE PRTPEXCPUB
Performance *DASDPERF2[6]	02. Physical Disk IO[6] 04. Faults 07. Size of Objects used During Pex Trace Collection 08. CPU Utilization	IOS FLTS OBJSIZE PRTPEXCPUB
Virtual Addresses *ADDRESSES[4]	06. Address Consumption 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	ADDR OBJSIZE PRTPEXCPUB
Disk Utilization/IO *BUSYDISK[1]	02. Physical Disk IO[1] 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	IOS OBJSIZE PRTPEXCPUB
Object size/Change in Size *DISKSPACE[4]	05. Disk Space Consumption[4] 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	NETSIZE OBJSIZE PRTPEXCPUB
Full File Opens *OPENS[1]	1. Full File Opens[1] 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization	OPENS OBJSIZE PRTPEXCPUB

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Table 21 (Page 2 of 2). Enhanced PEX TRACE Data Collection and Reporting Options

Data to Collect for SMTBCH Command "Problem Type"	Report Menu Option Available on PEXTRC02 Menu	Reporting Command
Activation Groups *ACTGRP	03. Activation Group Creates 07. Size of Objects used during Pex Trace Collection 08. CPU Utilization 09. Program Activations and Deactivations	ACTGRP OBJSIZE PRTPEXCPUB DEACTS
Program Deactivations *DEACTS	03. Activation Group Creates 07. Size of Objects used during PEX Trace Collection 08. CPU Utilization 09. Program Activations and Deactivations	DEACTS ACTGRP OBJSIZE PRTPEXCPUB
Job Task switches[7] *JOBSWAIT[7]	None[7]	None[7]

Note:

1. = Must specify MI *ENTEXTMI in order to get application program names.

2. = While these reports run from *PERF data, normally the *PERF data run is too short for these reports to be meaningful.

3. = More data is collected using *PERF than any other choice. Choose a short run time for *PERF collections of 5 to 10 minutes only.

4. = Use a long run time for these options (consider using 10+ hours). Long run times are essential for meaningful reports to be produced from these options. Thus, do not run these reports against *PERF runs (short trace time) as results are misleading.

5. = Application program names are not collected using this option; application program name appears as 'TOPOFSTACK' on reports.

Events collected are:

- DASD events - Read Start, Read Completion, Write Start, Write Completion
- BASE events - PMCO:

 ASM and SAR events are not collected.

6. = Application program names are not collected using this option; application program name appears as 'TOPOFSTACK' on reports.

Events collected are:

- DASD events - Read Start, Read Completion, Write Start, Write Completion
- SAR events
- BASE events - PMCO:

 ASM events are not collected.

7. = This option is provided for IBM Software Support use only. There are no reports available.

E.2 Physical Disk I/O Types

This topic lists physical disk I/O type mnemonics that appear in various Performance Explorer reports.

Table 22 (Page 1 of 2). Physical Disk IO TRACE Mnemonics

Physical IO Type	Description
*RS S	Start of a synchronous explicit DASD read I/O initiated by an explicit SAR READ/BRING request (as opposed to an ***implicit*** DASD read due to a page fault).
*RS A	Same as *RS S except performed asynchronously.

Table 22 (Page 2 of 2). Physical Disk IO TRACE Mnemonics	
Physical IO Type	**Description**
*RX S	Similar to *RS S except the program (LIC, OS/400) issuing the SAR READ/BRING request has additionally provided the address of pages that are to be ***replaced*** with the newly read data. The 'X' in the mnemonic stands for ***exchange*** and the full name is ***exchange read*** or ***exchange bring***.
*RX A	Same as *RX S except performed asynchronously.
*RC	Marks the completion of either an *RS S, *RS A, *RX S, or *RX A.
*RSF S	Start of a synchronous implicit DASD read I/Os due to a page fault.
*RSF A	Start of a synchronous implicit DASD read I/Os due to a page fault that occurs during the servicing of some asynchronous I/O request (fairly rare).
*RCF	Marks the completion of an *RSF S or *RSF A.
*WS S	Start of a synchronous explicit DASD write I/O initiated by an explicit SAR WRITE/PURGE request. The pages written are not made "easy steal candidates".
*WS A	Same as *WS S except performed asynchronously.
*WC	Marks the completion of either a *WS S or *WS A.
*WSP S	Start of a synchronous explicit DASD write I/O initiated by an explicit SAR WRITE/PURGE request. The pages written are made "easy steal candidates" following the I/O.
*WSP A	Same as *WSP S except performed asynchronously.
*WCP	Marks the completion of either a *WSP S or *WSP A.
*PR	Start of a non-virtual READ-SECTOR type physical DASD read. This is redundant because it is followed by an *RS which denotes the "real" start of the I/O.
*PR C	Marks the completion of a *PR. This is redundant; it is preceded by an *RC.
*PW	Start of a non-virtual WRITE-SECTOR type physical DASD write. This is redundant because it is followed by a *WS, which denotes the "real" start of the I/O.
*PW C	Marks the completion of a *PW. This, too, is redundant; it is preceded by a *WC.

E.3 MI Object Types

This topic lists MI object types. For a further description, please refer to Chapter 16 of the *OS/400 Diagnostics Aids Manual*, LY44-4907-00.

See also Section 9.6, "Object Names and Types Appearing in TRACE Reports" on page 242.

Note: System Objects are defined by a two-digit object type code followed by a two-digit object subtype code.

For Example:

- 0B90 is the object type/subtype of the data space portion of a physical file.
- 0C90 is the data space index portion of a physical or logical file.

This table lists all the object types available.

Table 23 (Page 1 of 2). List of System Object Types	
Type	**Name**
01	Access group
02	Program
03	Module

Table 23 (Page 2 of 2). List of System Object Types	
Type	**Name**
04	Context, permanent or temporary
06	Byte string space
07	Journal space
08	User profile
09	Journal port
0A	Queue
0B	Data space
0C	Data space index
0D	Cursor
0E	Index
0F	Commit block
10	Logical unit description
11	Network description
12	Controller description
13	Dump space
14	Service description
15	Mode description
16	Network interface description
17	Connection list
18	Queue space
19	Space
1A	Process control space
1B	Authorization list
1C	Spelling aid dictionary
1D	Auxiliary server description
1E	Stream file
81	Machine context

E.4 Full File Opens per Second Guidelines

This table provides guideline values for open file rates that are considered ″good″ and ″bad.″ You must compute the opens per second from the Enhanced PEX TRACE ″Full File Opens″ report open file counts.

Table 24. Full File Open Guidelines

Resource Description	Good	Bad
Full File Opens per Second:		
- Model 510	<10	>40
- Model 530	<40	>160

Note: These guidelines refer to the number of full file opens occurring per second system-wide and should be used to determine whether or not there is room for releasing CPU currently spent performing this work. The full opens may be required by the application or the system may be able to process higher rates of full opens. These values are merely guidelines to call your attention to functions affecting performance that should receive additional investigation.

The numbers in this table do not represent physical limits achievable on the AS/400 system. They represent what is reasonable, given that the system is in a steady state (for example, users are staying signed-on and not doing sign-on/off) and given that appropriate file pre-opens are in use with SHARE(*YES).

We could not perform testing for a wide variety of model and feature numbers. So for other models, use the Relative Performance Rating (RPR) values or relative CPW values to interpolate for slower or faster models than the ones listed here.

E.5 Activation Group Creates per Second Guidelines

Too many program activation group creates, which may happen in an ILE environment, can degrade performance. You can obtain then number of activation group creates from the Enhanced PEX TRACE ″Activation Grou Creates″ report.

Table 25. Activation Group Creates per Second Guidelines

Model	Maximum Rate Per Second[1]	Maximum Rate Per Second[2]
510 - 2144	55	2.7
530 - 2153	440	22

Note:

[1] = These figures represent 100% CPU being used to perform activation group creates.

[2] = These figures represent 5% CPU being used to perform activation group creates.

We could not perform testing for a wide-variety of model and feature numbers. So for other models, use the Relative Performance Rating (RPR) values or relative CPW values to interpolate for slower or faster models than the ones listed here.

Appendix F. Special Notices

This publication is intended to aid ″AS/400 performance experts″ in doing detailed performance analysis of either an entire application environment or specific applications or programs within the overall run-time environment. In general, the users of this redbook are assumed to be familiar with OS/400 performance considerations, usage of the Performance Tools/400 licensed program 5716-PT1, and are using the Performance Explorer capabilities because other tools have proven unsuccessful in identifying the cause of one or more performance problems. The information in this publication is not intended as the specification of any programming interfaces that are provided by OS/400 (5716-SS1) or the Performance Tools/400 licensed program 5716-PT1.

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Appendix G. Related Publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this redbook.

G.1 International Technical Support Organization Publications

For information on ordering these ITSO publications see “How to Get ITSO Redbooks” on page 505.

- *AS/400 Performance Management V3R6, V3R7*, SG24-4735

 Note, this redbook is scheduled for publication during 2Q, 1997.

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G.3 Other Publications

These publications are also relevant as further information sources:

- *AS/400 Work Management*, SC41-4306
- *Performance Tools/400*, SC41-4340
- *BEST/1 Capcity Planning Tool*, SC41-3341

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List of Abbreviations

CISC	Complex Instruction Computing System
CL	Control Language
CPU	Central Processing Unit
FSIOP	File Server I/O Processor
HLL	High Level Language
ILE	Integrated Language Environment
IMPI	Internal Microprogramming Interface
IOP	Input Output Processor
ITSO	International Technical Support Organization
LIC, VLIC	Licensed Internal Code (software and hardware) LIC and SLIC are identical terms for the same microcode
OPM	Original Program Model
PAG	Process Access Group
PEX	Performance Explorer
PDC	Performance Data Collector
PRPQ	Programming Request for Price Quotation
RISC	Reduced Instruction Computing System
SAR	Segment Address Range
SLIC	System Licensed Internal Code (software and hardware) LIC and SLIC are identical terms for the same software
TPST	Timing and Paging Statistics
WSF	Workstation Function

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